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STONE AGE CULTURES OF BELLARY

(Being a report of the excavation at Sanganakallu)

By

BENDAPUDI SUBBARAO, M.A., LL.B.

POONA

1948

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FOREWORD

Regional archæological surveys planned by the Department of Proto and Ancient Indian History of this Institute have been in progress for some time. Gujarat and Maharashtra have been partly surveyed, and further work in these regions is still proceeding. In Andhra the Bellary District occupies geographically and culturally an important position; it lies at the cross-roads of Maharashtra, Karnatak and Andhra, and is the gateway to the Tamil Nad. It has long been regarded as the focus of the Neolithic Cultures of the South. With a view to ascertain their relation with the palæolithic and the historic cultures a scientific study of this region was thought desirable. The Institute deputed Mr. Subbarao for this purpose.

The Report now presented embodies Mr. Subbarao's account of a small scale vertical excavation at the factory site of Sanganakallu. The conclusions have been tentatively utilized to interpret the large mass of surface material gathered from a systematic exploration of the region. The work which forms part of a doctoral dissertation for the degree of Ph. D. of the University of Bombay may be considered only a further stage in the previous efforts of Robert Bruce Foote, the father of Indian Prehistoric Archæology and indicates that a large scale horizontal excavation is urgently necessary. This alone will enlighten us on the full significance of the conclusions reached at Brahmagiri and Sanganakallu.

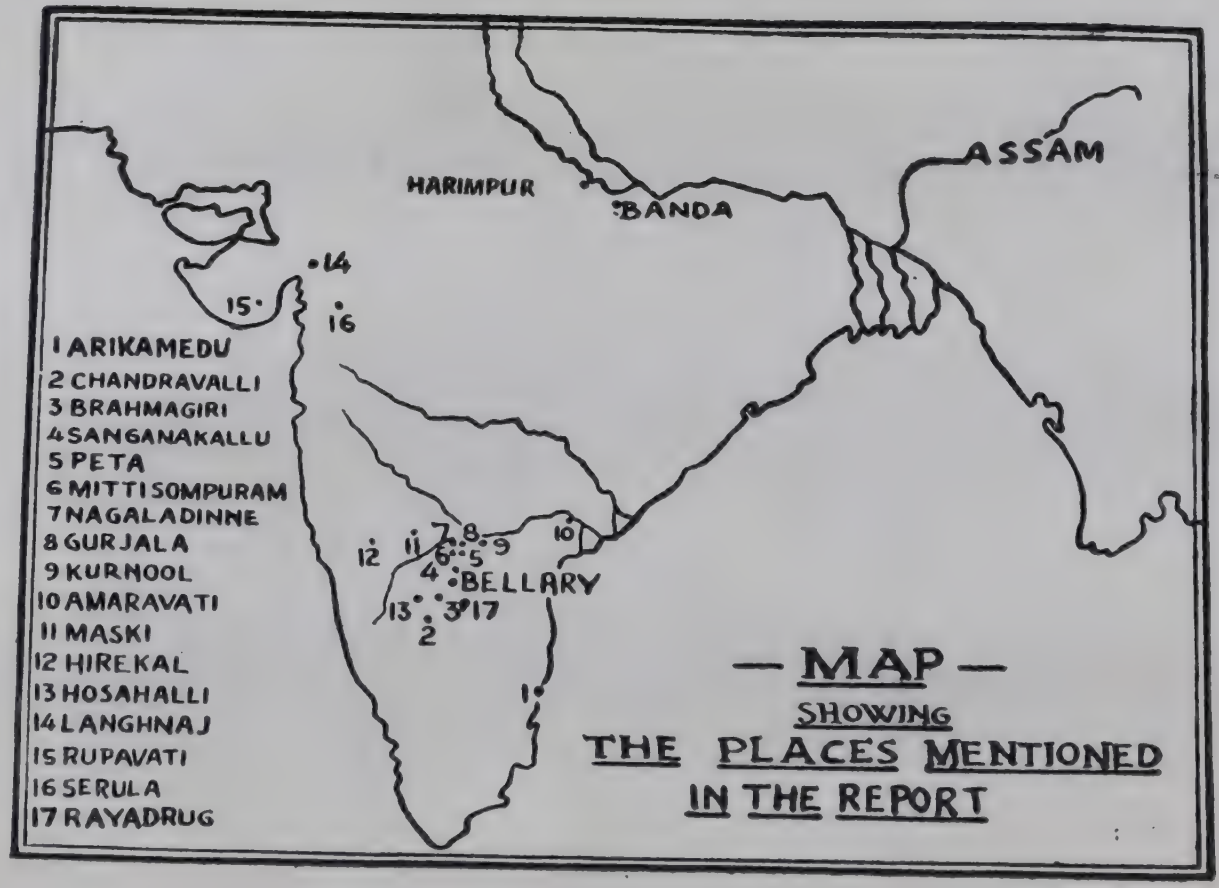
Mr. Subbarao's excavations would not have been possible but for the permission granted by Dr. R. E. M. Wheeler, the then Director-General of Archæology in India. It may be stated that the projected survey would not have materialized had he not encouraged the idea when it was first mooted in 1945. The Institute is therefore grateful to Dr. Wheeler for his help and interest in this work. Thanks are also due to the Government of Madras, and in particular to Sri K. N. Anantaraman, I.C.S., the Collector of Bellary and to Dr. A. Aiyappan, Superintendent, Government Museum, Madras and to Mr. V. D. Krishnaswami, Superintendent, Archæological Department, South India, for their co-operation. Similarly the thanks of the Institute are due to Dr. Eugene Worman, Jr. and Dr. Kirk Bryan of the Peabody Museum, Cambridge, Mass., U. S. A., for their promptness in reporting on the patinated specimens from the excavation, and to Mr. M. G. Venkatesiah for his hospitality to Mr. Subbarao during his stay at Bellary.

S. M. KATRE.

2nd December, 1948.

CONTENTS

		Page
	Foreword	v
I.	Introduction	1
II.	Excavations at Brahmagiri	1
III.	Excavations at Sanganakallu	5
	1. The Site	5
	2. Aims and Objects of the Excavations	5
	3. Trench I	7
	4. Trench II	7
	5. Phase III	9
	6. Phase II	9
	7. Phase I	10
	8. Finds— (i) Pottery	11
	(ii) Stone Implements	20
	(iii) Miscellaneous	26
IV.	Correlation with the Surface Evidence from Bellary	27
V.	Typology—(Neolithic Stone Industry)	31
	1. Technique of Manufacturing Axes	31
	2. Range and Forms of Bellary Axes	33
	3. Miscellaneous Tools	39
	4. Microlithic Industry	41
VI.	Index to Plates	45


HARIMPUR
BANDA
ASSAM
BELLARY
1 ARIKAMEDU
2 CHANDRAVALLI
3 BRAHMAGIRI
4 SANGANAKALLU
5 PETA
6 MITTISOMPURAM
7 NAGALADINNE
8 GURJALA
9 KURNOOL
10 AMARAVATI
11 MASKI
12 HIREKAL
13 HOSAHALLI
14 LANGHNAJ
15 RUPAVATI
16 SERULA
17 RAYADRUG
— MAP —
SHOWING
THE PLACES MENTIONED
IN THE REPORT

STONE AGE CULTURES OF BELLARY

I. Introduction

THE following account of the Stone Age Cultures of Bellary represents the beginning of an intensive study of an area—roughly a circle of about 60 miles radius—with the town of Bellary as the centre. This is considered to be "a pivot of the lower Deccan"[1] and a corridor for the migration of cultures in South India[2] located as it is at the junction of the main trans-continental routes. But this account is not exhaustive and requires to be confirmed or modified in the light of further study.

The main work was done in three short seasons of surface exploration and a small scale vertical excavation conducted at the factory site of Sanganakallu. Thus the work consists of a summing up of all available evidence, viz. typology, technique, physical condition of the tools and stratigraphy. The whole evidence is correlated with the excavations conducted at Brahmagiri by the Archæological Survey of India and the writer's own excavation at Sanganakallu.

The excavations conducted at Sanganakallu have confirmed and extended the evidence about the Stone Age Cultures of the region found at Brahmagiri (40 miles away from Bellary in the Mysore State). A summary of the results of both the excavations is given below.

II. The Excavations at Brahmagiri[3]

Brahmagiri is located 40 miles S. W. by S. of Bellary, in the Molkalmarru taluk of Mysore State. In its neighbourhood, three Asokan inscriptions have been found. The ancient city of Isila is identified with this place.[4] The excavations have revealed a continuous occupation at this site going back to a late phase of the Neolithic or the Stone Axe Culture.

Brahmagiri passed through the following phases:

On the top, was found, a culture belonging to the Andhra period, about the beginning of the Christian era, characterized by the presence

---

[1] K. N. DIKSHIT, *Presidential Address—Indian History Congress*, 6th Session (1943).

[2] F. J. RICHARDS, *Geographic Factor in Indian Archæology*, IA LXII, p. 235.

[3] The following account is based mainly on a brief report of the excavations published in *Illustrated London News* (Nov. 15th, 1947) by Dr. R. E. M. WHEELER and the writer's own personal observations at the time of the excavations.

[4] M. H. KRISHNA, *Presidential Address, Anthropology and Archæology Section, Indian Science Congress*, Baroda (1943), p. 20.

of imported or imitated "Rouletted Ware,"[5] in association with a red slipped pottery decorated with criss-cross yellow paintings.[6]

Below this and overlapping into the Andhra period, was found a megalithic phase, lasting for about three centuries ending about the "later part of the first century B.C."[7] Simultaneous excavations, at the habitation area and in their cemetery, showed that this phase was characterized by the burials in stone cists (port-hole cists) and stone circles associated with a highly polished red and black pottery and red slipped ware.

"Beneath the megalithic phase of the ancient town and interlocked with the beginning of that phase, was a deep stratified deposit characterized by numerous polished stone axes and by burials in crude hand-made urns together with numerous small implements (microliths) of quartz, agate and other hard materials and rare fragments of copper and bronze. . . . The preceding chalcolithic "Stone Axe Culture" is widely known in Deccan from surface finds, but has never previously been assigned even to an approximate position in the culture sequence of the region."[8]

A study of the large number of stone implements and pottery from Sanganakallu[9] showed that the Sanganakallu area passed through almost the same phases.

An additional feature of Sanganakallu was the location of the "factory" and the finding of a large number of patinated tools and flakes on the surface.

Before taking up a detailed account of the excavations at Sanganakallu a short summary of the results may be stated to give an idea of the relation of the evidence from both the sites.

At Brahmagiri, the stratigraphic horizon of the megalithic pottery (the polished pottery found in the burials and in the habitation) was fixed. This pottery, found at the top at Sanganakallu provided a firm datum for a sequence dating of the finds below the layers yielding it.

On the top, was found a phase representing the beginning of the megalithic, interlocked with a late phase of the Stone Axe Cul-

---

[5] This pottery was found in association with Arretine and other Roman ware at Arikamedu in a Roman warehouse, excavated on the east coast of India at Pondicherry.—*Ancient India*, No. 2.

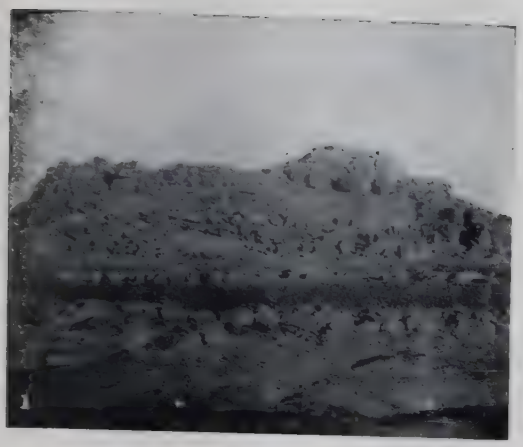
[6] This pottery was found in association with Satavahana coins and a coin of Augustus at Chandravalli in the excavations conducted by the Archæological Survey of India in 1947. It is also associated with ancient Satavahana sites at Amaravati, Kondapur and Hadkal.

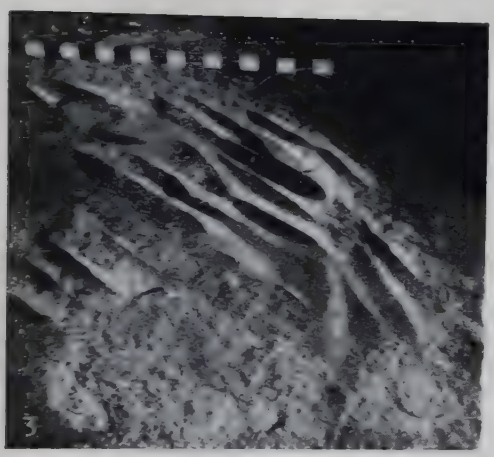
[7] R. E. M. WHEELER, op. cit., p. 554.

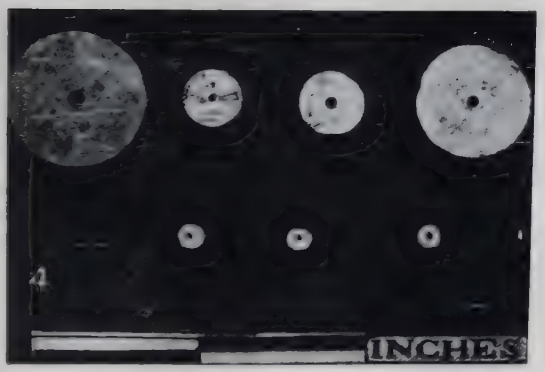
[8] Ibid.

[9] B. SUBBA RAO, *Archæological Explorations in Bellary*, BDCRI, VIII, Parts 3 and 4, pp. 1-16. Here an interim report on the surface explorations carried out in the area has been given with the relation of the finds at Sanganakallu to those from the excavated finds at Brahmagiri.

PLATE A







1. A view of the Sannarasamma hill (Sanganakallu). 2. Trench I on the top of the hill before excavation. 3. Grinding grooves at Sanganakallu. 4. The disc beads found in the excavation. 5. Megalithic potsherds from the excavation.

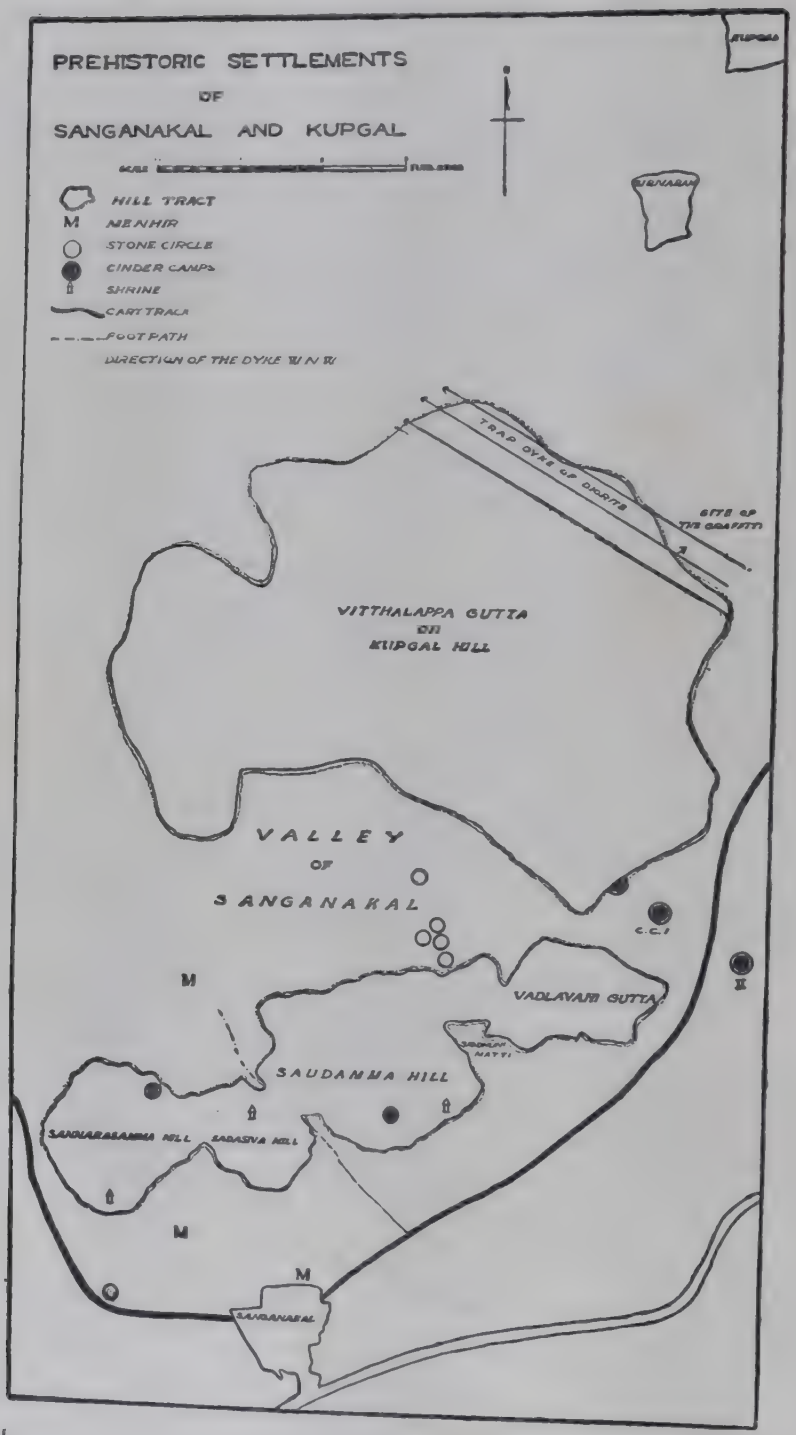
ture, confirming the evidence of overlapping of both the cultures noticed at Brahmagiri.

Below the megalithic phase was a stratified deposit representing the Neolithic Axe Culture associated with coarse brown and black, and pale-grey pottery, chipped and polished axe heads and a microlithic industry of chert, jasper and quartz.

Below this and separated by a thin barren layer, were found heavily patinated flakes of trap and sandstone associated with a crude microlithic industry of quartz.

Thus the relation of Sanganakallu with other excavated sites may be stated as follows:

ARIKAMEDU	CHANDRA-VALLI	BRAHMAGIRI	SANGANA-KALLU
Rouletted ware in association with Arretine and other Roman ware.	Criss-cross painted ware in association with rouletted ware and Satavahana coins and a coin of Augustus	Criss-cross in association with rouletted ware	
		Megalithic Pottery	Megalithic Pottery, Phase III.
		Chalcolithic "Stone Axe Culture." "1,000 B.C. or beyond"	Phase II Sub-period 2 (on the basis of pottery)
			Phase II Sub-period I True Neolithic
			Phase I. Heavily patinated flakes.


PREHISTORIC SETTLEMENTS
OF
SANGANAKAL AND KUPGAL
HILL TRACT
M MENHIR
STONE CIRCLE
CINDER CAMPS
SHRINE
CART TRACK
FOOT PATH
DIRECTION OF THE DYKE W N W
KUPGAL
VENKABAI
TRAP DYKE OF DIORITE
SITE OF THE GRAFFITI
VITTHALAPPA GUTTA
OR
KUPGAL HILL
VALLEY
OF
SANGANAKAL
C.C.I
II
M
VADLAVATTI GUTTA
SAUDAMMA HILL
SANGANAKAL

Pl. II.

III. Excavations at Sanganakallu[10]

(1) Site

Sanganakallu village is located three miles northeast of the town of Bellary on the "Bellary-Moka" road. The prehistoric and early historic settlements are located in and around the group of hills to the north of the village. This is, indeed, the southern arm of a huge horse-shoe shaped valley with the "Kupgal" hill as its northern arm. The excavation was conducted on the top of Sannarasamma hill, the westernmost of the three hills falling within the revenue jurisdiction of Sanganakallu. This small hill, about 100 feet high above the surrounding fields, is typical of the castellated hills of the Bellary district, overlooking the vast plains all round. There is a large shallow plain ground (more than 10,000 square feet in area) surrounded by boulders on all sides except in the north, which opens into the valley below. Even in prehistoric times, the habitation seems to have been confined to the top of this hill and the valley.[11]

Foote mentioned "made grounds at Sanganakallu,"[12] but according to him, this hill fell into the second category of sites, on the basis of their relative importance.[13] Apparently, he did not see the top of this hill, the most unique in the district, on account of the extent of the plain on the top and the existence of suitable rock shelters capable of habitation. This hill retained the traces of the old habitation, as it was not made the target of "the pleasures of celt-hunting."

(2) Aims and Objects of the Excavations

The area was first explored by the writer in 1946[14] and a study of the surface evidence convinced the writer that it was a huge factory site, where the axes and other neolithic implements were made from the local basalt, found in lenticular masses in the coarse-grained diorite trap dyke running across the neighbouring hill.

As already explained, the finds made on the surface, showed a close resemblance to those from Brahmagiri. An additional feature was the finding of patinated tools and flakes.

---

[10] I am very grateful to Dr. S. M. KATRE, the Director and DR. H. D. SANKALIA, Head of the Proto and Ancient Indian History Department, of the Deccan College Research Institute, Poona, for the grant, which enabled me to conduct the excavations at the site, and to DR. R. E. M. WHEELER, Director General of Archæology in India for granting the necessary permission to conduct the excavations.

[11] In a recently dug well pit, only 100 yards from the south foot of this hill, there was absolutely no trace of habitation.

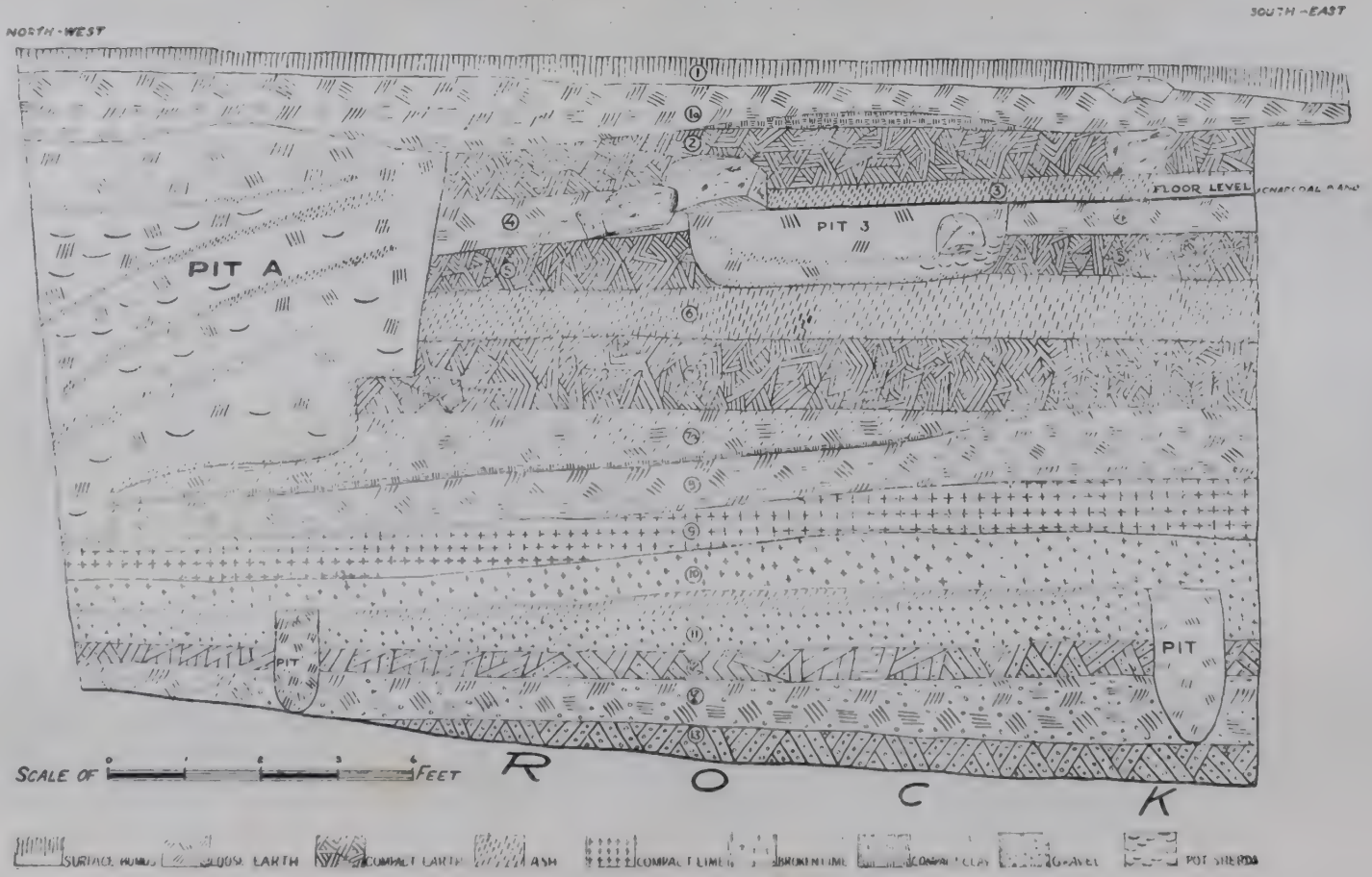
[12] FOOTE, *Indian Prehistoric and Proto-historic Antiquities* (IPPA), *Catalogue Raisonne*, p. 79.

[13] FOOTE, *Notes on some recent Neolithic and Palaeolithic Finds in South India*, JRASB, LVI, Part 2, No. 3 (1887).

[14] B. SUBBARAO, op. cit.

SANGANAKALLU

TRENCH II SECTION FACING SOUTH WEST



Pl. III

The top of Sannarasamma hill did not yield any criss-cross pottery of the Andhra period, but only megalithic and pre-megalithic pottery. As the resources were very much limited, it was decided to dig on the top of this hill (showing signs of a predominantly pre-megalithic habitation) to take back the cultures to an earlier period, if possible.

With this object, two trenches (8 ft. x 12 ft. and 8 ft. x 18 ft.) were dug on the top of the hill, one in the centre of the plain and the other near one of the biggest rock-shelters on the top.

(3) Trench I

This trench is located in the middle of the plain. It was dug up to a depth of 7 feet 9 inches, when the boulders were struck. No virgin soil or ancient humus was met and the evidence of habitation consisting of ashy soil, microliths, etc., was found right in the crevices of the boulders, showing that the people settled almost on the bare rock.

In the course of the excavations ten layers (1, 1a, 2, 3, 4, 5, 6, 7, 8, 8a) were exposed. On the basis of the finds they fall into two main phases with the possibility of sub-division of the lower phase into two sub-periods. Stratigraphically there is no break and it represents a long continuous occupation at the site.

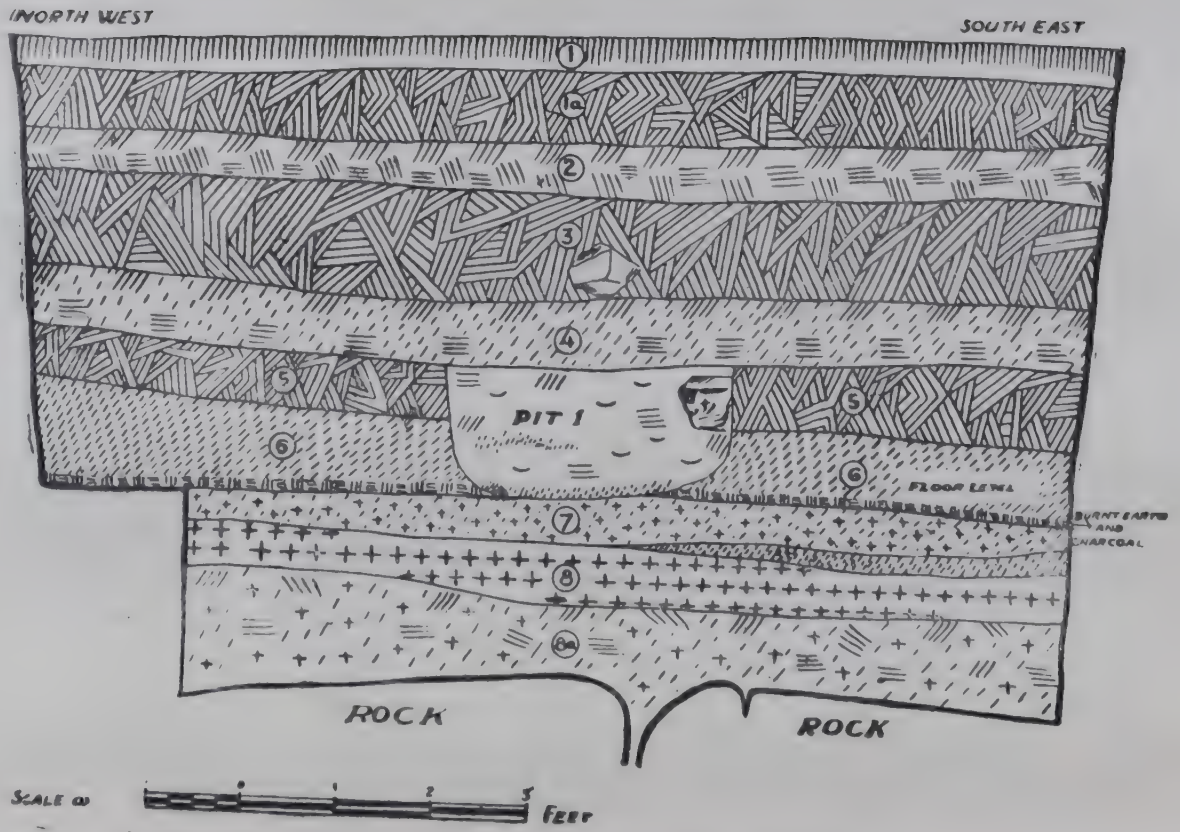
No structures were found but for a loose line of stones resting on the top of layer 5, probably some crude retaining wall (?). So, most probably, either they were living in the shelters or in huts of some perishable material. A few deep but narrow pits (post holes ?) were found, but there was no evidence of any plan about them.

(4) Trench II

This trench is located to the south-east of Trench I, near the largest natural shelter on the top. The evidence of occupation was found to a depth of 9 feet, when a thin deposit of natural humus (layer 13) was struck. In this trench, the rock was struck a little deeper than in Trench I. Layers 1 to 11 represented the two phases already noticed in Trench I. The flakes and tools found up to the layer (11) are fresh and unpatinated. But an earlier phase was found beneath the 11th layer, separated from the cultures above by a thin barren layer (12). The soil constituting layers 12, 12a and 13, is a red, ferruginous, gritty gravel, mixed with humus. Evidence of occupation was furnished by the layer 12a, which yielded large quantities of patinated flakes. But there were no traces of ash, as in the layers above layer 12.

SANGANAKALLU TRENCH I

SECTION FACING NORTH EAST



Pl. IV

No structures were met with. In the southern corner of the trench, there was a big pit (Pit A or a disturbance) cut into layers 3, 4, 5, 6, 7, 7a and 8 and sealed by 2. So, as the excavation proceeded, the pit was cleared in advance to have an unmixed evidence of the sequence from the layers, into which it is cut.

(5) Phase III

This phase is represented by layers 1, 1a, and 2 of Trench I and 1, 1a, 2 and 3 of Trench II. It is characterized by the presence of highly polished red and black and pure black pottery, associated with a coarse brown and black, and burnished hand-made pottery and polished stone axes and flakes.

As already described, the polished pottery of this phase corresponds in fabric and in shapes to the megalithic pottery found both in the habitation as well as the megalithic burials at Brahmagiri.

Thus this phase represents the mixed megalithic and pre-megalithic cultures co-existing at the site, confirming their overlapping at Brahmagiri, already noticed.[15]

(6) Phase II

This represents the highly developed phase of the pre-megalithic Stone Axe Culture. It is represented by layers 3 to 8 of Trench I and 4 to 11 of Trench II. There is no stratigraphic evidence to subdivide this deep stratified deposit, representing a long continuous occupation. But on the basis of the relative quantitative distribution of the two main fabrics of pottery, the pale-grey ware and the coarse brown and black ware, which dominate the lower and upper levels respectively, and equally strong evidence of the microlithic facies of this phase, it is possible to divide Phase II into two sub-periods. The following table will give an idea of the quantitative analysis of the stone implements which clearly shows the greater association of microliths with the lower layers representing Phase II.

The flakes and other tools of trap are quite fresh and have no patination.

---

[15] This overlapping was first noticed by FOOTE in 1884 at Patpad in the Kurnool District where he found "cores and flakes and prehistoric glazed pottery... together with celts and a variety of neolithic implements.... I do not hesitate in regarding the Patpad find as a late neolithic overlapping into the Iron Age." There is no doubt that the glazed pottery referred to by FOOTE is Megalithic as he refers to funnel-shaped vessels with iron stands.

An interesting account of the excavation conducted by FOOTE is found in JRASB, LVI, Part 2, No. 3, 1887.

Layer No.	TRENCH I			TRENCH II		
	Flakes (Trap)	Implements (Trap)	Microliths	Flakes	Implements	Microliths
1	7	—	—	208	—	2
1a	94	—	—	172	3	7
2	228	—	—	125	—	2
3	95	1	3	117	—	5
4	41	1	6	59	1	8
5	30	—	2	12	—	6
6	41	—	6	47	—	5
7	4	—	13	34	1	13
8	2	2	13	67	2	29
9	—	—	—	46	—	11
10	—	—	—	37	3	3
11	—	—	—	12	—	6

Phase II. Sub-period 1[16] (2)

This period is represented roughly by layers 3, 4 and 5 of Trench I and 4, 5, 6 and 7 of Trench II. It is characterized by coarse brown and black hand-made, and a few pieces of pale-grey ware in diminishing proportions. In this phase a few sherds with violet and purple paintings on a dull background and sometimes on a dull red slip, were also found.

This pottery is associated with a rich axe industry, associated with a weakening microlithic facies.

Phase II. Sub-period 2 (1)

This is represented by layers 7 and 8 of Trench I, and 8, 9, 10 and 11 of Trench II. It is characterized by the presence of fresh stone axes and flakes, associated with a fine microlithic industry of chert and jasper characterized by parallel-sided blades and lunates blunted along the arc. The pottery of this phase is mainly of the pale-grey variety, though a few pieces of coarse brown and black ware have been found.

(7) Phase I

This phase represents the earliest occupation at the site and is separated from the succeeding phases by a thin barren layer (12). It is characterized by the presence of a large number of heavily pa-

[16] On the basis of the pottery, this corresponds to the early "Chalcolithic Stone Axe Culture," associated with a flat copper celt with splayed edges found at Brahmagiri.

tinated flakes of trap and sandstone associated with crude microlithic industry of quartz and chert.

Very few pieces of much comminuted pottery (the largest piece being about ¾ of an inch) were found in and around Pit IV. This pottery, which is of the same fabric as the pale-grey ware, may be a subsequent infiltration. Hence there was no definite evidence of the association of pottery in this phase.

(8) Finds

As the top of the Sannarasamma hill was essentially a prehistoric site of the Neolithic Axe Culture, the finds from the excavation included large quantities of pottery, stone axes and other tools, large quantities of fresh flakes of trap (by-products of the main axe factory), heavily patinated flakes of trap and sandstone, and microliths found in two different horizons showing evidence of two independent (?) industries. The relation between them was not clear.

Pottery

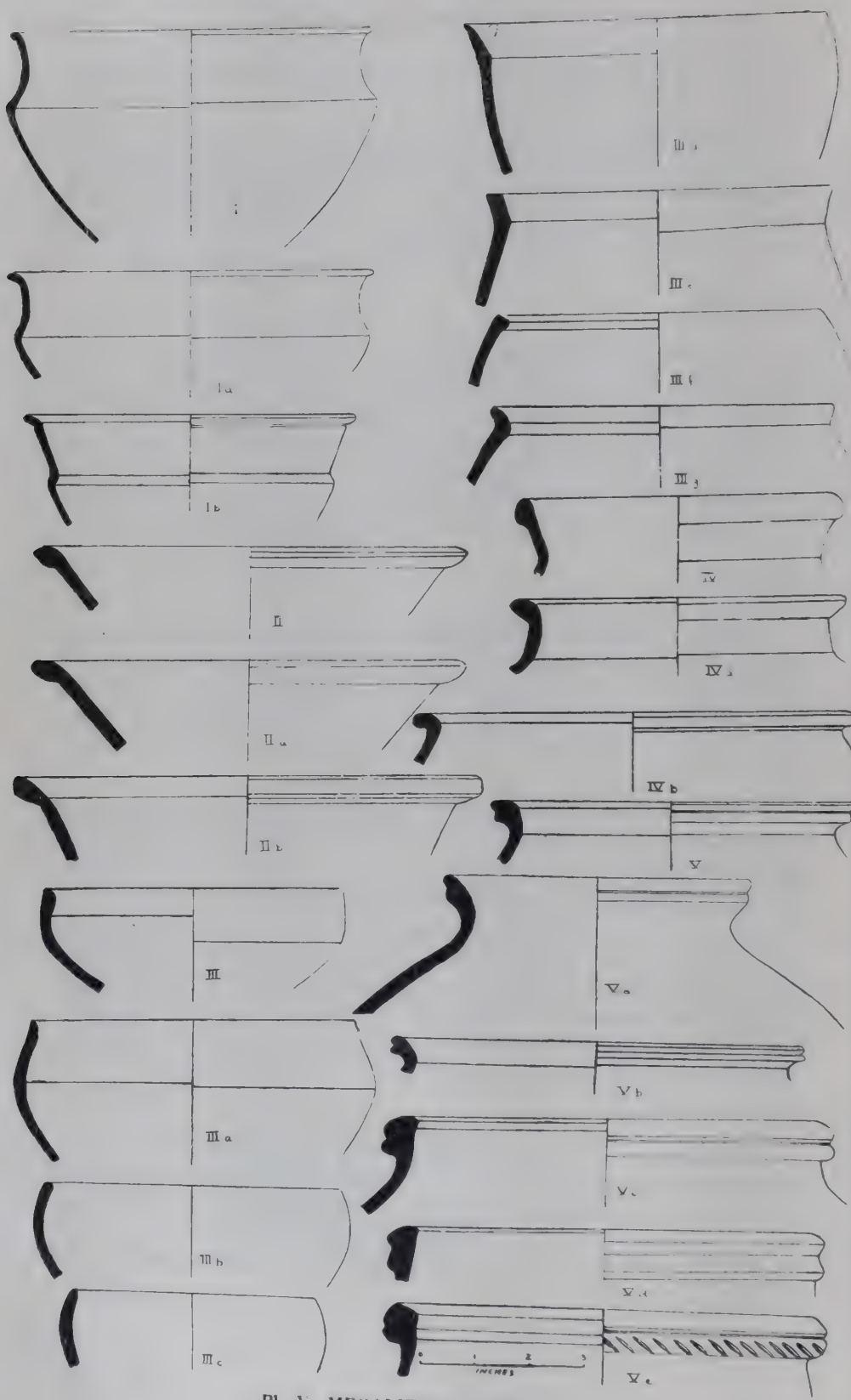
The significance of the megalithic ware, on which the chronology of the site depends, is already noticed earlier. So following the same scheme of classification, the pottery has been divided into megalithic and pre-megalithic, corresponding to Phases III and II respectively. The definite association of pottery with Phase I is not certain, as already explained.

Though Phase III is a mixed megalithic and pre-megalithic one covering the latest phase of the Stone Axe Culture interlocked with the beginning of the megalithic, the pottery of the latter has been treated separately. For it represents a culture intrusive to the region.

About the pre-megalithic or the Stone-Age pottery, it represents a long continuous occupation without any apparent stratigraphic break. Hence the sub-division of Phase II depends on the relative quantitative distribution of the fabrics described below. So while discussing types, their chronological position will be indicated, while the pottery of the whole phase has been treated as one entity.

Megalithic Pottery

This pottery consists of finely-polished thin ware. It is made of fine clay and generally it is very well burnt. The pots are black inside as well as at the rim and neck portions, and red or brown in the lower portions, furnishing evidence of inverted firing. They are all wheel turned and are very well made, but a few of them are irregular.



Pl. V. MEGALITHIC POTTERY

The megalithic folk introduced a wide variety in the shapes of their pots. One of the prominent types, the rimless bowl, had a very early beginning as that type was found in the pale-grey ware.

Type I is a funnel-shaped (?) polished vessel, with an excurved rim having an out-turned lip and a carination at the shoulder. Ia is a similar vessel with a more prominent lip. Ib is a similar vessel with a straight or slanting rim.

Type II is a polished, lipped, shallow bowl with a rounded base (?). IIa and IIb are variants of the same type.

Polished Bowls

Type III is a round-based carinated bowl without a rim, and a slight clubbing inside. IIIa is a similar bowl with an outward projection at the belly. IIIb and IIIc are curved bowls of the same type. IIId is a bowl similar to IIIc, but at one end the side is pushed out and down giving a rudimentary ladle or spout. IIIe is a round-based bowl with an excurved rim, which has a straight or flattened top. IIIf is a bowl with an incurved beaded rim and a small inward projection at the neck.

Type IV is a neck and rim portion of a vessel with dull red slip and a clubbed rim. IVa and IVb are similar types with an external beading at the rim.

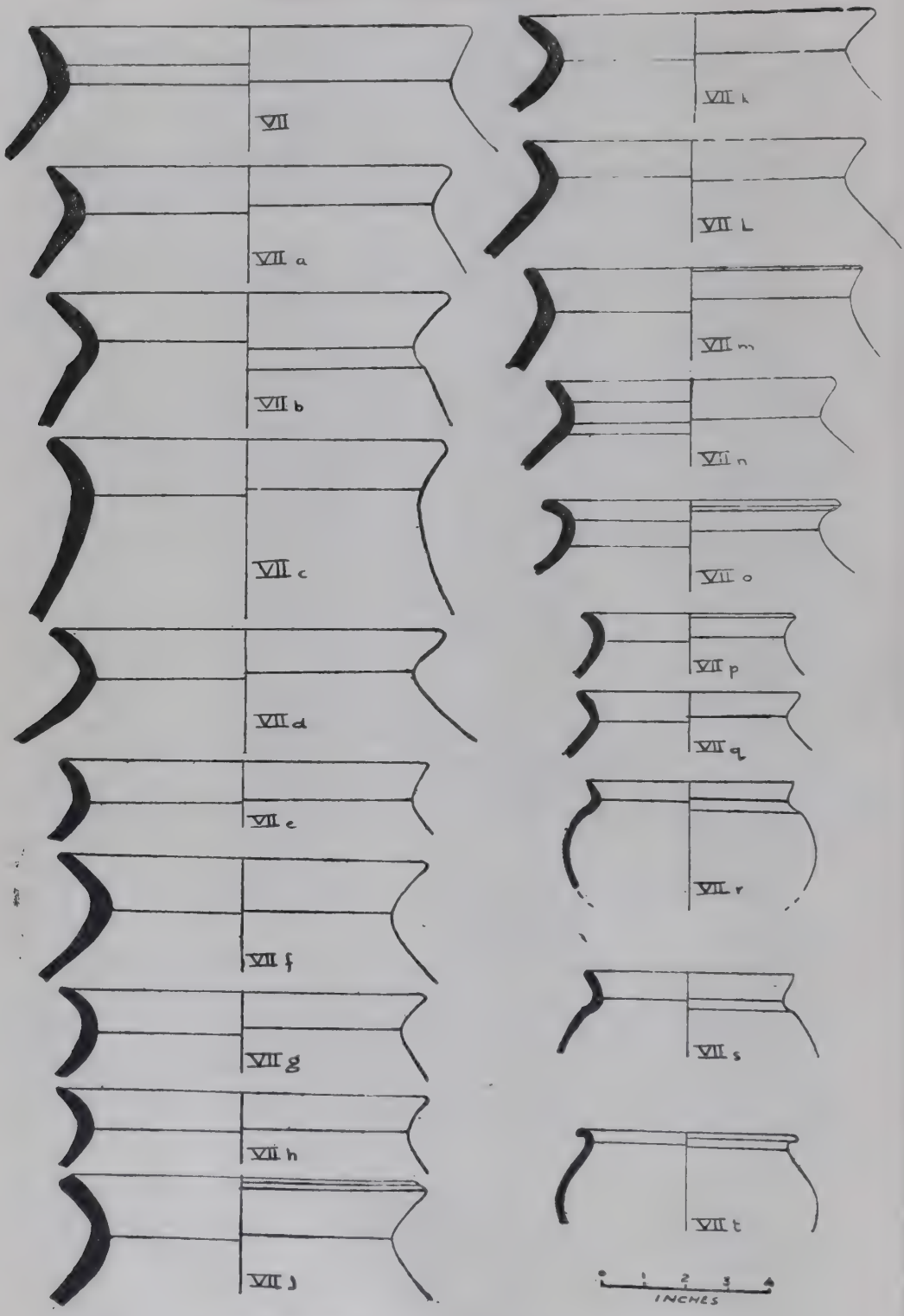
Type V is a rim of a large, bright red slipped pot with a single-grooved rim. Va and Vb are similar rims, differing only in the height of the neck. Vc and Vd are of the same type with deeper and wider grooves on the rim. Ve is similar to Vc and Vd, but it has an ornamentation consisting of deeply incised slanting strokes giving a rope effect.

Type VI is a small, globular vessel with a beaded rim. (Pl. VIII).

Stone-Age Pottery (Pre-Megalithic)

This pottery consists of crude and coarse hand-made ware associated with a few hand-made burnished types. The clay is not fine and quartz or coarse sand is used as the degraissant. The pottery burns to a dull brown or black colour. With this pottery was found pale-grey ware consisting generally of fine clay mixed with lime and mica. The pale-grey ware was predominant in the sub-period 1 of Phase II. It appears in sub-period 2 also but in a very small quantity and only the developed forms appear in that period.

Type VII is a coarse hand-made oval pot (urn type) with a simple flared rim. VIIa to VIIh are essentially the same forms. VIIb has a ledge at the shoulder. VIIj is an interesting, flared-neck type with an external groove on the rim. The pot is black inside.



PL. VI COARSE BROWN AND BLACK WARE: PRE-MEGALITHIC

VIIk and VII l are similar to VII. VIIm and VIIn have flattened rims similar to VIIj, but there is no groove. VIIo has a beaded rim. VIIp and VIIq are smaller vessels with simple, flared rims. VIIr and VIIs are probably globular vessels with ledges at the shoulder and ex-curved rims. VIIt is a small vessel with a prominent beaded rim.

Ornamented Pottery

The ornamentation on some of these vessels consists of an incised finger groove pattern, and sometimes applied bands of finger tips. The grooves are impressed on small bands of clay around the shoulder.

Type VIIu is a thick flared-necked "urn type" vessel with a flattened rim, on the top of which, the finger grooves are impressed. VIIv and VIIw are of flared-necked vessels with finger grooves on the outer face of the rim.

A small rim piece—probably of the same type as VIIu—has a double row of grooves on either side (No. 1 of Pl. VII). Another interesting piece (No. 2 of Pl. VII) has two concentric circular bands of fingertip ornaments.

Painted Ware

A few pieces of dull brown potsherds with violet and purple paintings on them were found.

Nos. 5 and 6 of Pl. VIII have single lines. No. 8 has a complicated design consisting of lines and circles but it is broken. Nos. 4 and 9 are rim pieces of burnished bowls with red ochre paintings. No. 7 has a wide violet band with cross-hatching and criss-cross design below. No. 3 has a comb pattern painted on dull brown or red background. These sherds belong to sub-period 2 of Phase II.

Type XIV is a small, round-based bowl, with a straight rim and an inward projection at the neck and a carination at the belly. It has a comb pattern painted all round the shoulder in red ochre. This belongs to the sub-period 1 of Phase II. (Found in layer (8) of Trench I.)

Type VIII is a small, coarse dish with a central lug for holding. It is probably a lid.

Type IX is a small, coarse, round-based bowl.

Burnished Hand-made Ware

A few types of hand-made, burnished ware were found in the excavation. They belong to sub-period 2 of Phase II. In the same fabric a few spouts were found. Probably these were the precursors of the polished megalithic ware.

Pl. VII. PRE-MEGALITHIC DECORATED POTTERY

Pl. VIII. PRE-MEGALITHIC BOWLS

Type X and Xa are burnished spouts. Xc is a narrow long spout in pale-grey ware, but belongs to the same period.

Type XII is a flat-based burnished jar.

Type XIII and XIIIa are thick flat-based burnished bowls.

Perforated Pottery

A large number of perforated potsherds were found. Their shape could not be reconstructed. They are treated as Type XI. These potsherds characterize the whole of Phase II.

Pre-Megalithic Bowls

An interesting series of rimless bowls with round bases (?) were found in the pale-grey ware as well as in the coarse, brown ware.

Type XV is a typical incurved bowl in pale-grey ware. XVa and XVb are similar bowls in brown ware. XVc of pale-grey ware, is a similar bowl, but at one place the side is pushed out and down, to give a rudimentary spout or ladle. XVd is a similar bowl in brown ware. XVe is a similar bowl with a deeper and a larger ladle.[17]

Type XVI is a shallow round-based dish with extended sockets on either side for holding. XVIa is a similar bowl.

Type XVII is part of a bowl (?) with a projecting lug (specially attached) for holding.

Types XVIII and XIX are the chief types in the pale-grey ware, which is characteristic of Phase II, Sub-period 1. Both the types taken together show a certain development in the rim, from a short, straight rim with an inward projection at the neck to an excurved or flared rim and finally to a funnel-shaped rim making an acute angle at the neck.

Another interesting feature of the highly developed forms of Type XIX is their method of manufacture. The rim is made separately and joined to the body of the vessel at the neck. XIXf and XIXg show evidence of a joint at the neck inside the pot.

Type XVIII is a very short-rimmed vessel with an inward projection at the neck. XVIIIa is similar to it, but the external curvature of the rim becomes prominent. XVIIIe and XVIIIf are similar rim pieces showing evidence of a gradual increase in the height of the rim. XVIIIg and XVIIIh are the portions of vessels showing carinations at the belly.

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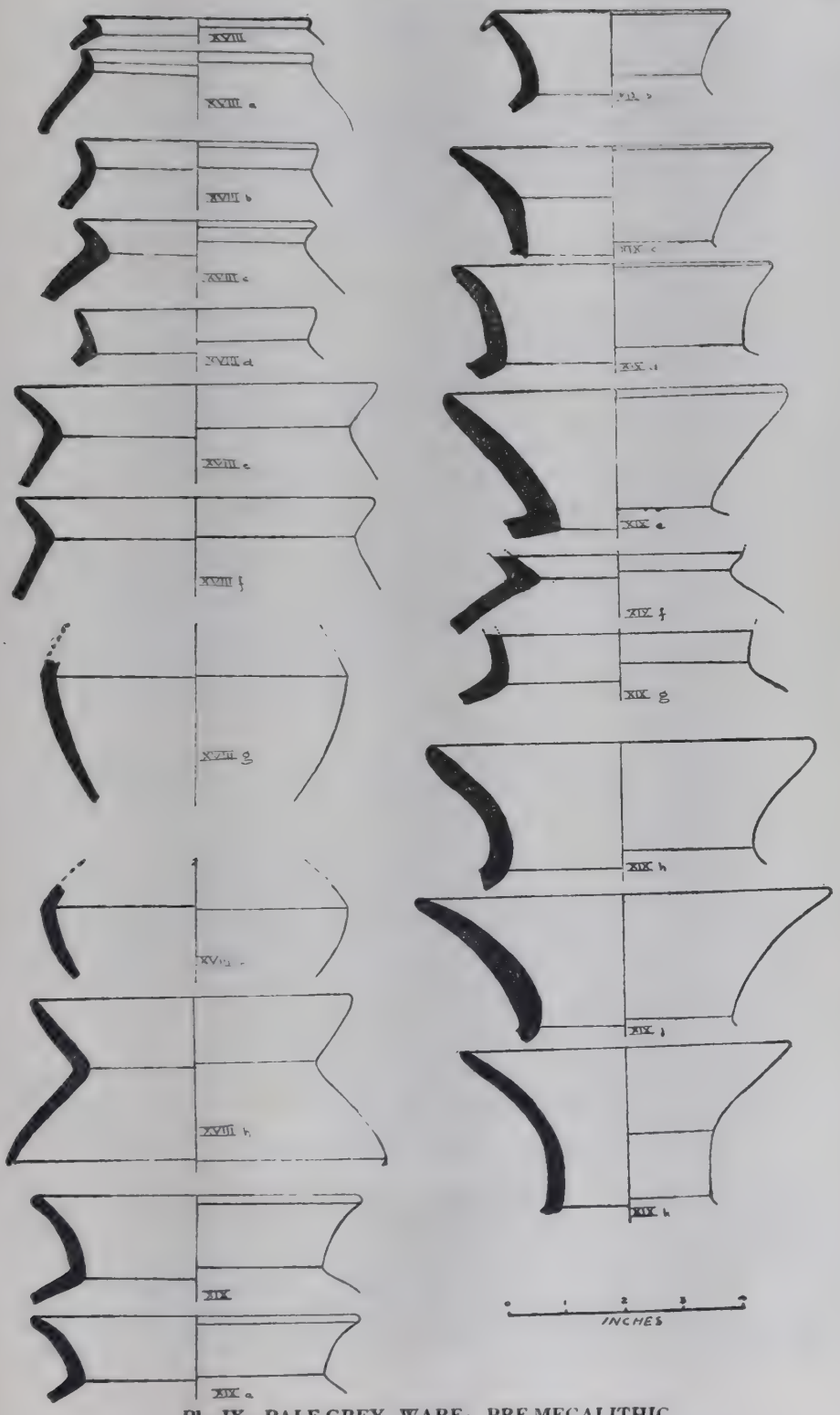
[17] Similar bowl with a single ladle was found by Foote at Patpad in the Kurnool District. No. 2605-22, IPPA, Pl. 26.



Pl. IX. PALE-GREY WARE: PRE-MEGALITHIC

The Type XIX is a developed form of XVIII and is more characteristic of Phase II, Sub-period II. This form has a funnel-shaped rim, which joins the body of the vessel making an acute angle at the neck. The highly developed forms of this type are burnished. XIXa and XIXb are similar vessels. Gradually the angle at the neck becomes small. In XIXc to XIXf, the funnel-shaped rims make angles.

XIXh to XIXk are burnished rims with narrow, high necks and funnel-shaped rims.

The Patinated Flakes (Pl. XIII)

The following interesting flakes, characteristic of Phase I have been found in the layer 12a. This underlay a barren layer (12). They have heavy, brownish patination.[18] The flakes are made of trap and sandstone. About 400 flakes in all have been found. These can be divided into long flakes and large thick flakes.

The long flakes show a primary longitudinal flaking resembling Levallois technique with plain striking platforms making an angle of about 100° with the positive flake surface on the underside, leaving prominent bulbs of percussion. Nos. 1 and 3 of Pl. XIII are concavo-convex flakes of sandstone. Nos. 2, 4, 6 and 7-14 are simple flakes with well-marked platforms.

The short, thick flakes are also made on a technique resembling Levallois. They show a bold convergent flaking all along the periphery and the underside retains the large primary flake surface. No. 15, made of sandstone, does not show any evidence of further working on the underside. In the case of No. 16, flakes are taken all along the periphery, but they do not converge and hence a portion of the original cortex is left intact. But in this the underside is also flaked to give a zig-zag cutting edge. But a large portion of the primary flake surface is intact.

These discoid flakes might have been used as scrapers—especially No. 16 which has a zig-zag cutting edge secured by chipping on both the sides.

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[18] Some specimens were kindly examined by Dr. Kirk Bryan at the instance of Dr. Eugene C. Worman (Jr.) of the Peabody Museum, U. S. A. An extract from his report is given below:

"The term 'patina' can properly be used in an archæological sense to mean a zone of weathering, which extends below the surface of a piece of stone and which represents a chemical change in the nature of the rock. You would therefore be justified in using the term 'patina' to refer to the discoloured layer around the outside of your specimens."

Microliths of Phase I (Pl. XIV)

Associated with these flakes, were found large quantities of microliths, mainly of quartz. Nearly 500 flakes of quartz have been found. But on account of the bad material no definite implement types could be made out. With the quartz flakes were found a few encrusted pieces of chert and jasper.

About six flakes of chert were found. No. 1 of Pl. XIV is a large, leaf-shaped primary flake with a well-marked striking platform. The bulb was removed subsequently. On one side, small flakes have been removed, but there is no clear evidence of retouch. Probably it is a side scraper (?).

Of the numerous quartz flakes No. 2 of Pl. XIV is a large, thick, primary flake. The platform was removed subsequently. On one end, a large flake was removed giving a sharp working end. Probably it is an end scraper or cleaver.

No. 3 is a large, leaf-shaped primary flake, with a good platform. There is no trace of secondary working.

Nos. 4, 5, 6 and 16 are simple flakes.

Nos. 14 and 15 are small-blade fluted cores. No. 14 has a plain striking platform, while that of No. 15 is facetted.

No. 17 is an interesting core scraper. On one side the large pebble cortex is left intact, while the other shows large flake scars. Small flakes were removed all along the periphery on the cortex side, giving a good core scraper.

Very few pieces of bluish, mottled jasper have been found. Nos. 7 to 13 are all simple primary flakes, without any trace of secondary working.

The Unpatinated Tools and Flakes (Pls. XI and XII)

This whole group of flakes and tools belongs to Phase II of the excavation. This represents the most highly developed phase of the Neolithic Cultures of Bellary, coinciding with the most flourishing stage of the "factory" at Sanganakallu, as the large number of rejected chips (by-products of the industry) found in the excavation show.

Layer No.	No. of Flakes in Trench I	No. of Flakes in Trench II
1	7	208
1a	94	182
2	228	125
3	95	117
4	41	59
5	30	12
6	41	47
7	4	34
8	2	47
9	—	46
10	—	37
11	—	12
Total	535	946

Besides the 1,481 flakes of trap, about thirty tools have been found, including axes in various stages of manufacture,[19] showing a variety in their shapes,[20] pounders, slick-stones or polishers, sling-stones, and chisels.

Axes (Pl. XI)

No. 1 of Pl. XI from layer (10) is an interesting re-chipped axe. The polished cutting edge, which is left intact, retains traces of a little patination.

No. 2 is an unfinished axe head showing bold alternate flaking on both the faces and neat tiny alternate flaking on one side.

No. 3 from layer (3) is a large unfinished axe showing bold peripheral alternate flaking on both sides, leaving large portions of primary flake surface on both sides.

No. 4 is a broken, but completely polished axe head with a convex cutting edge, rounded sides meeting the flat medial area of the faces, and a flat oval section across the butt.

No. 5 is a chipped and polished axe head with some portion of its cutting edge and faces ground, probably due to use.

[19] After a detailed study of a large number of implements found on the surface of the plain ground on the top of the hill, the exact stages of manufacture have been described separately.

[20] Similarly, the forms of axes from Bellary have been dealt with separately.

No. 6 is a large flake axe with a semi-rectangular body, straight sides and a straight cutting edge. The edge is ground due to use.

No. 9 is also a similar flake axe, but it is very irregular. A large part of the tool is ground due to use.

No. 8 is a broken butt end of an axe showing a semi-rectangular section.

A number of broken unfinished axes and butt ends of axes have been found but all of them are not illustrated.

Pounders

In the course of the excavation, eleven pounders or hammer stones have been found. They are large, thick, flat discoids, with traces of battering all along the thick sides.

Chisels (Pl. XII)

One broken working end and two broken butt ends of chisels were found. No. 4 (Pl. XII) is a working end of a highly polished chisel. Nos. 2 and 3 are butt ends of chisels.

Slick-stone (Pl. XXIII. 18)

Another type, which resembles the pounder externally, but differs from it functionally, is the slick-stone or polisher. Three of them were found in the excavation. They are thick, flat, plano-convex discoids. The lower side is flat and is highly polished due to rubbing on a flat surface.

Sling-stone (Pl. XXIII. 19)

A perfectly spherical stone of granite, about two and a half inches in diameter was found. It has no battering on the surface, showing that it is not a pounder. Probably it is a sling-stone (?).

Finally a broken half of a thick ellipsoid plano-convex stone disc (?) of granite was found in the 11th layer. It is probably a palette. (Pl. XII. 1)

Microliths of Phase II (Pl. XV)

Associated with a full-fledged polished axe industry, a very rich microlithic industry was found as a different facies of the same culture. This microlithic facies of Bellary Neolithic Industry is to be associated with Sub-Period I of Phase II, as the industry weakens into the next phase, which shows a predominance of trap axe industry. From the large number of microliths found in the excavation (considering the smallness of the excavated area) and the large number of short blade cores found on the surface on the top of the hill, one cannot resist the conclusion that it is a factory site.

This industry is much superior when compared to that of Phase I, from which it is stratigraphically separated; but their relation is not yet known.

In all, about 140 specimens have been found (including regular implements and mere flakes). There is no evidence of variety in the tool types. A remarkable feature is the predominance of parallel-sided blade-flakes and regular parallel-sided blades blunted on one side by steep retouch; (about 15 specimens). Some of them show broken or serrated edges, probably due to use. No. 14 of Pl. XV shows definite evidence of use, which gives a fine polish along the irregular edge.

Another type is the lunate, blunted along the arc by steep retouch. Three lunates have been found in the excavation.

Thus this microlithic industry may be described as an industry characterized by parallel-sided blades and lunates of chert and jasper.[21]

Nos. 1 and 2 from layer (9) are lunates of chert blunted by steep retouch along the convex back.

No. 3 from layer (10) is a rectangular knife blade of jasper, blunted along the back by steep retouch.

No. 4 from layer (9) is a rectangular knife blade with parallel flake scars and two medial ridges. One side is blunted by retouch, while the other has irregular concavities, probably due to use.

No. 5 is a rectangular blade of chert with one middle ridge. One side is blunted by retouch.

No. 6 from layer (2) is a triangular point with the slightly rounded side showing signs of retouch and the other side has concavities probably due to use.

No. 7 from layer (9) is a semi-rectangular flake of quartz with two medial ridges and one side is blunted by retouch (?).

No. 8 from layer (3) is a long rectangular knife blade with two parallel flake scars and a retouched back and concavities on the other edge probably due to use.

No. 9 from layer (9) is a long rectangular parallel-sided flake with a medial ridge. One side is blunted by retouch.

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[21] Jasper and banded chert are found in the Dharwar bands belonging to that system in the Bellary District. Hence the nearest source of jasper for this site is about ten miles. Besides, jasper pebbles are found in abundance in the shingle beds of the river Tungabhadra. Pure chert is found in the limestone region of the neighbouring Kurnool District.

No. 10 from layer (7) is a long knife blade of chert with parallel sides and one side blunted by retouch and the other showing concavities probably due to use.

No. 11 from layer (10) is a long pointed knife blade of chert with one edge slightly rounded to meet the other straight edge. The rounded edge is retouched.

No. 12 from layer (3) is a long pointed crystal flake with parallel sides and a middle ridge. There is a notch (?) at the butt end, probably for hafting.

No. 13 from layer (8) is a parallel-sided semi-rectangular blade of chert. One side shows concavities probably due to use.

No. 14 from layer (7) is a semi-rectangular flake of chert. One side is blunted by steep flakes. This is probably an instance of cross flaking on the core before this flake is taken out. The edge shows polish due to use.

No. 15 from a pit is a semi-rectangular thin blade of jasper with a back blunted by steep retouch.

No. 16 from Pit A is a short pointed blade of chert with a blunted back, which is rounded to meet the straight side which has a broken edge.

No. 17 from layer (8) is a broken rectangular knife blade with a medial ridge and parallel flake scars. One side is blunted by retouch.

No. 18 from layer (9) is a long parallel-sided flake with a blunted back showing evidence of cross flaking on the core.

No. 19 from layer (6) is a long pointed flake with no retouch.

No. 20 from layer (6) is a long rectangular parallel-sided flake with concavities on the edge, but no trace of retouch.

No. 21 from layer (7) is a long flake of chert with parallel flake scars, but no retouch.

No. 22 from layer (2) is a long parallel-sided flake, with no retouch.

No. 23 from layer (9) is a pointed flake of chert with no retouch.

No. 24 from layer (8) is a long rectangular flake with concavities on one side but no retouch.

No. 25 from layer (7) is a long rectangular flake with a steep back consisting of a long parallel flake (the flake is triangular in section). One end has small flakes removed probably for hafting (?).

No. 26 from layer (8) is a parallel-sided flake of agate with no retouch.

No. 27 from layer (6) is a parallel-sided flake of chalcedony.

No. 28 from layer (7) is a long parallel-sided flake with a blunted back.

No. 29 from layer (8) is a long thick rectangular flake of chert with no retouch.

No. 30 is from layer (11) and is a rectangular flake of chert.

No. 31 from layer (10) is a parallel-sided flake with evidence of cross flaking on the core.

No. 32 from layer (9) is a parallel-sided flake of jasper.

No. 33 from layer (8) is a long pointed flake of chert with an edge showing varities due to use.

No. 34 from layer (8) is a long thick flake of chert with no retouch.

No. 35 from layer (5) is a pointed flake of chert.

No. 36 from layer (9) is a flake of quartz.

No. 37 from layer (5) is a flake of agate with a waist (?) at the bottom, but no retouch.

No. 38 from layer (3) is a chalcedony flake.

No. 39 from layer (8) is a long parallel-sided flake with no retouch.

Beads (Pl. A)

Among the other finds may be mentioned seven disc beads of steatite (?) or dolomite (?) varying in sizes from 5/8 of an inch to 3/16 of an inch.

1. Disc 3/4 of an inch diameter from (4) of Tr. II.
2. Disc 11/16 of an inch diameter from (5) of Tr. II.
3. Disc 3/8 of an inch diameter from (1a) of Tr. II.
4. Disc 5/16 of an inch diameter from Pit.
5. Disc 3/16 of an inch diameter from (3) of Tr. I.
6. Disc 3/16 of an inch diameter from (3) of Tr. I.
7. Disc 3/16 of an inch diameter from (3) of Tr. I.

Worked Bones (?)

Two pieces of worked bones have been found. One of them No. 5 of Pl. XII is a cylindrical point or awl, with a notch at the butt end probably for hafting. The other bone No. 6 of Pl. XII from layer (4) is ground by rubbing, but the purpose of the tool is not clear.

Cinder

In Trench I, a few pieces of vitreous slag[22] (?) were found.

IV. Correlation With the Surface Evidence From Bellary

As already stated in the Introduction one of the objects of the excavation at Sanganakallu was to confirm and extend the evidence found at Brahmagiri.

Thus the most important result of both the excavations may be stated to be the fixing of the lower limit of the Neolithic Culture of Bellary and its relation to Proto and Early Historic Cultures of South India.

In the course of his surface explorations, the writer found stone implements of trap, microliths, etc.

Hence a provisional classification of the Stone Age Cultures of Bellary has been made on the basis of typology, technique and physical condition of the tools, and correlated with the evidence of both the excavations. The excavation conducted at Sanganakallu, was on a very limited scale. The available stratigraphic evidence is not sufficient to give a sequence of the Stone Age Cultures in the whole of the Bellary region. As the horizons of the various tools have been indicated in the vertical excavation, a large scale horizontal excavation will complete the picture. Thus the following provisional classification requires to be confirmed or modified in the light of further study.

Series I

The flakes of trap and sandstone associated with a crude microlithic industry of Phase I of Sanganakallu, described earlier, represent the earliest occupation at the site. Accepting the functional economic classification of CHILDE,[23] we may take the Neolithic as the age of agriculture and pottery and implied food producing economy. This industry seems typologically to lead to the regular neolithic industry, characterized by the grinding and polishing of implements made of fine-grained material like trap in Bellary.

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[22] This is similar to the cinder found in mounds at the eastern foot of "Kupgal hill," but its exact significance cannot be judged at present.

[23] CHILDE. *Changing Methods and Aims in Pre-history*, PPS. Vol. I (N. S.), p. 7.

But on account of the limited scale of the excavation, the exact character of the industry has yet to be determined. A large number of flakes with a lighter patination were found on the surface, displaying almost the same technique. In view of the opinion of DR. KIRK BRYAN that the "objects of trap on the ground patinate more slowly than those underground as a rule,"[24] the probability however cannot be dismissed, that the flakes belonging to Phase I may be the by-products of an early neolithic industry. This point will become clear on a comparison of the flakes and tools found on the surface at Sanganakallu and elsewhere in the Bellary District. The evidence of pottery in this phase is not definite and large-scale excavation may throw some light on it.

At Rayadurgam (Rayadrug), a large number of flakes were found on the top of one of the local hills. They have heavy brownish patination. Nos. 1, 2, 3 of Pl. XVI are large concavo-convex flakes with longitudinal flaking, plain striking platforms and prominent bulbs of percussion, taken out by a technique resembling Levallois. No. 5 is a typical thick discoid flake showing the same technique, with convergent flaking on one side. The underside is not worked. But in the case of No. 6, the flaking is not bold, but it is worked on both the sides giving a sharp cutting edge, making it more suitable for a scraper.

At Sanganakallu, Bellary town and "Kupgal" hill, a very large number of flakes were found. These show a light yellowish-brown patination. Their material is entirely trap. Typologically they have got their proto-types in Phase I and Phase II, but their exact relation with finds from both phases, is not clear for the present.

The flakes show a primary longitudinal flaking resembling Levallois technique. No. 7 to 11 (Pl. XVI) are large flakes with plain well-marked striking platforms and prominent bulbs. The edges are somewhat broken—probably due to use—but there is no evidence of secondary working. No. 12 shows neat secondary flaking on one side and hence may be called a sidescraper. No. 13 is a concavo-convex flake. No. 14 is worked on both the sides, but a large portion of the primary flake surface is left intact. This might have been used as an end-scraper, because the thick bulbular end is flaked for hafting purposes.

[24] Already referred to in footnote No. 18. DR. BRYAN also says "that it is impossible to determine the age of any rock specimen or implement on the basis of patination except in the most general way. Two specimens of exactly the same age may display quite different stages of patination depending upon the soil and water conditions in their immediate vicinities. This is true for an area even as small as a few square yards. Patination progresses faster when the object is underground and subjected to the chemical action of water. Depending upon the amount of water available at any particular spot, whether at the top of a knoll or the bottom of a small depression, patination may be fast or slow. Objects of trap on the ground surface patinate more slowly than those underground as a rule."

Among the thick discoidal flakes a large number of biface scrapers have been found. (Pl. XVII)

No. 1 has convergent flaking on one side and a plain well-marked platform, leaving the large primary flake surface intact.

Nos. 2 and 3 are worked on both the sides, but on the under-side a large portion of the primary flake surface was left intact.

Nos. 4 and 5 are ovates and display bold alternate flaking leaving a large portion of the cortex intact. But in the case of No. 4, the large primary flake surface was left intact. No. 6 is a thick pointed ovate.

Having the same light patination a few regular axe heads have been found. But in the present state of our knowledge it is difficult to suggest any hypothesis of development from the discoids, ovates and pointed oval forms.

The axes Nos. 7 to 10 (Pl. XVII) have all the basal features of regular neolithic axes viz. a pointed butt, straight sides meeting a convex cutting edge and a flat oval section across the butt.

No. 7 is a completely chipped axe without any polish, displaying bold alternate step flaking all along the periphery leaving a large portion of the cortex on both the sides.

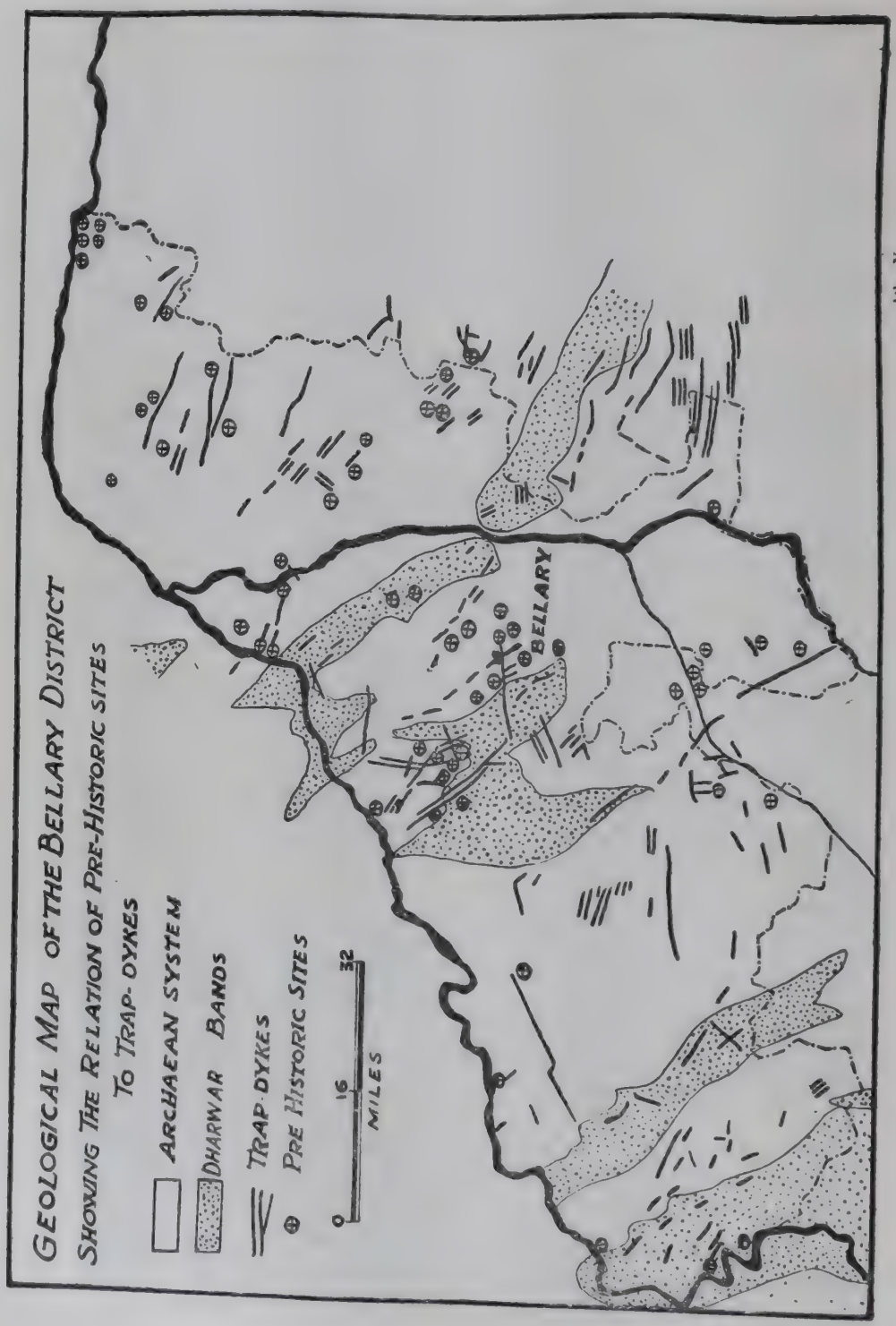
No. 8, 9 and 10 are chipped axes with ground or polished cutting edges, but showing the same basal features.

Thus the thin butted axe, with a more or less pointed butt, a convex cutting edge, sides rounded abruptly to meet the flat faces of the axe and a flat pointed oval section may be described as one of the earliest forms of Bellary neolithic axes.

Series II

As already explained, Sanganakallu is a huge factory site. Phase II represents the most highly developed phase of the Neolithic Culture of Bellary. The axes and other tools found in the excavation have already been described. But a large number of axes and other tools were found on the top of Sannarasamma hill (where the excavation was conducted). As we know the main cultural phases through which the area passed, there is no doubt that the large number of unpatinated tools found on the surface, belong to the same period as the unpatinated tools and flakes associated with Phase II at Sanganakallu.

This whole group may be called the Bellary Neolithic Industry. Now a fuller idea of the industry will be given on the basis of a study of specimens from the excavation and surface.



Pl. X. (After R. B. Foote)

V. Bellary Neolithic Industry—Typology

There is a bewildering variety in the forms of axes and other types of tools. The main types of tools composing the Neolithic Industry of Bellary are: axes, chisels, picks, fabricators, rounders, grooved hammer-stones, sling-stones, slick-stones or polishing stones, and discs.

The most important group of neolithic tools are the axes. Before describing the main forms, it is proposed to describe the technique of their manufacture.

Technique of Making Axes

As Sanganakallu was a "factory" site located near the source of basalt or trap rock, from which the axes and other tools were made, it was possible to collect a large number of axes in all stages of manufacture. FOOTE[25] assumed four stages of manufacture, but a more detailed study was made to ascertain the character of the industry.

The trap rock from which the axes are made, is found in small veins in large, coarse-grained diorite. The rock weathers into convenient nodules which might have been used by prehistoric man.

From the large number of primary flakes found in the excavation as well as on the surface in various sizes, it seems, they took large thick "spread flakes"[26] by striking too much into the body of the core and applying vertical pressure. No. 11c (Pl. XXI) and Nos. 1 and 3 (Pl. XXI) show the primary flake surface, which has been left intact. On some specimens even the large bulbs of percussion have been unaffected in the course of the making. A good axe with the original bulb of percussion is illustrated with axes of Type 10. Nearly forty unfinished axes retaining their primary flake surface were found at Sanganakallu.

By the use of bold, convergent, alternate, step flaking, they secured the shape of the axe. No. 1 (Pl. XVIII) shows a large axe in this stage (which may be called the first) with high ridges, which result from bold flaking. The alternate step flaking gives the sharp zigzag cutting edge. No. 1c (Pl. XIX) is a similar axe in the first stage with high ridges, but one side retains the large primary flake surface.

After the removal of these large flakes, the second stage aimed at removing the high angles of the ridges and perfecting the cutting edge. The high ridges were probably removed with a pointed tool.

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[25] FOOTE, IPPA, p. 85.
[26] A. J. H. GOODWIN, *Method in Prehistory*, p. 71, (1945).

A large number of fabricators,[27] found at Sanganakallu, would serve this purpose very well. No. 1a (Pl. XIX) is a fine axe after the second stage showing small flake surfaces with low ridges. The cutting edge is made more sharp by secondary working consisting of neat tiny alternate step flaking along the cutting edge only. No. 1d (Pl. XIX) shows the cutting edge after secondary working, and is ready for grinding.

The next stage is polishing. All the axes were not completely polished and in many cases, only the cutting edge was polished. No. 3 (Pl. XVIII) is a typical chipped and polished axe. Many specimens with ground cutting edges have been illustrated.

The polishing was done in two stages. In the first, the excessive roughness was removed by a preliminary grinding, which gave a rounded appearance, but not the high polish. No. 4 (Pl. XVIII) shows an axe in this stage.

Finally, a few selected specimens underwent the fourth stage, when the whole axe was finally polished—probably by grinding. Nos. 5 and 6. (Pl. XVIII.)

A very interesting evidence of the methods of polishing their tools, especially the edges, was found by FOOTE[28] on the "North Hill" in the town of Bellary. He noticed well-polished grooves, seven to eight inches long and one to one and a half inches deep, worn by grinding axes to a sharp edge, on the rock surface "near the middle of the south-east face of the hill and just on the edge of the terrace." The grooves lay together parallel and in close lines within a space of less than twenty inches square. FOOTE also noticed forty-three similar grooves at "Helalagundi"[29] (Holalgondi) in Alur taluk, at Kappatralla hill[30] in the Kurnool District, and Pullayyagudda[31] in Hyderabad State.

The writer noticed similar grooves at the south foot of Sannarasamma hill on an exposed boulder in the open fields. The grooves are found in groups.

This type of grinding groove is always associated with the celt or axe makers.[32]

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[27] SHETLIC, FALK, and GORDON, *Scandinavian Archæology*, p. 37.
[28] FOOTE, IPPA, p. 87.
[29] FOOTE, IPPA, CR. p. 92 (illustrated in Pl. 62 IPPA).
[30] FOOTE, IPPA, p. 117.
[31] FOOTE, JRASB, LVI, Part 2 (1887).
[32] Ibid.

Range and Forms of Bellary Axes

The Bellary axes show a very wide range in their forms, but it is not possible for us to notice any evolution or development—if there is any—at the present stage. As it was a "factory" site, where unfinished axes might show stray forms, care was taken to study only specimens showing definite evidence of previous use by their makers.

The axes are classified on the basis of their external form and median sections across the butt.

1. Ellipsoidal or Oval Section

This form has a triangular body, with extremely convex flaces and an ellipsoidal or oval section across the butt. The sides are rounded off and slope gently to meet at the centre, leaving little, or no flat medial area. Generally these are thick butted. (Pl. XX. 1.)

2. Flat Oval or Lenticular Section (Pl. XI. 4)

The second type of axes have extremely convex faces and a flat pointed (lenticular) or flat, oval, cross section across the pointed butt. The slope of the sides is not gentle and the rounded sides meet the flat medial area of the faces. The slope of the convex cutting edge, however, is gentle.

3. Circular Cross-Section (Pl. XX. 3-5)

These axes have a triangular body, with convex flaces, and a fairly circular cross section across the pointed butt end. The rounded sides meet in the middle along the length of the axe and hence the butt end is almost like a cone. So in the lower portion of the axe, the slope of the cutting edge starts in the middle to make the axe easy to handle and to give an efficient cutting edge.

At Brahmagiri a very highly polished axe with a circular cross-section was found. B (c) 10 from Sanganakallu is a chipped axe with a polished cutting edge. (Pl. XX. 2) Nos. 3, 4, and 5 are broken butt ends of axes with a circular section and they resemble cones.

This form is very well suited for the "spear-head method of hafting."

4. Semi-Rectangular Section (Pl. XX. 6-8)

This form has a triangular body, with a pointed butt, a semi-rectangular section across the butt and a convex cutting edge, which is slightly splayed. The sides are flat. No. 6 from Sanganakallu has a trapezoid section. On one side the ridges run parallel for about half the length and then diverge in opposite directions to meet the splayed convex cutting edge. B (c) 51 is a broken butt-end of an axe with rectangular section (8).

A good number of this type of axe have been found at Amaravati in the Guntur District (Madras Presidency) and are at present located in the Prince of Wales Museum, Bombay.

5. Blunt-Butted Axe (Pl. XX. 9 and 14)

All the above forms described so far have the pointed butt in common. But this form has a semi-triangular body, with convex faces and thick blunt butt. B(c) 33(9) from Sanganakallu is a chipped and polished specimen with a ground cutting edge, probably due to use. Perhaps it was used like a wedge and retained traces of battering due to the blows delivered on the blunt butt. A most interesting specimen of this type was found at Sanganakallu. It is a very heavy axe, with a disproportionate form and extremely convex and polished cutting edge. The butt is deliberately flattened or blunted and the ends of the flat butt end slope to meet the sides of the axe. The surface of the butt and the sloping surfaces on either side show signs of battering, showing its former use as a wedge (9).

6. Shoe-Last Celt or Axe (Pl. XX. 10-13)

Another but a more specialized form of axe is the plano-convex shoe-last celt or axe. The extremely convex upper surface curves round to meet the flat underside, which rises gently to meet it. No. 10 from "Fort Hill" of the town of Bellary is an extremely polished specimen. The pointed butt-end is slightly damaged. Nos. 11, 12 and 13 are chipped and polished specimens with the same features. No. 13 is an irregular specimen with slightly concave underside, the ends rise gently to meet the convex upper surface.

This form, associated with early agriculture, is a special feature of the Danubian Neolithic Cultures.[33] The presence of this highly specialized tool, might indicate that the Bellary neolithic folk were agriculturists. But, we do not have a complete picture of the civilization of the neolithic people of Bellary. The axe is hafted adze-wise to an "L" shaped piece of wood and used as a hoe.[34]

7. Semi-Rectangular Body (Pl. XXI. 1-5)

This form has a semi-rectangular body, with straight sides, a straight cutting edge and flat oval section. No. 1 is a chipped and polished specimen with a ground cutting edge. No. 2 has a very finely polished sharp cutting edge and it almost looks like a chisel with a broad cutting edge. No. 3 is a flake axe with a ground cutting edge, probably due to use. No. 4 is an interesting specimen of gneiss and is entirely ground. It has a straight polished cutting edge, which may be due to use. No. 5 is a chipped and polished specimen.

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[33] Childe, *Dawn of European Civilization*, p. 172.
[34] Burkitt, *Our Early Ancestors*, p. 116.

8. Axe-Hammer (Pl. XXI. 6)

Another specialized form is that of the axe-hammer. It has a semi-triangular body with a flat oval cross-section. The rounded sides slope abruptly to meet the almost flat faces of the axe. The working end is a flat-arc. Many specimens show signs of battering along the working end and the sides, showing how it must have been used. It is quite likely that blunted axes were used as axe-hammers. In India no perforated axe-hammers have been found though perforated mace-heads were found. We do not know whether it is hafted or held free hand. B(c) 57 is a ground specimen.

9. Adze (Pl. XXI. 7 and 8)

The adze is again a specialized type of axe used for chipping or slicing the surface of the wood. It is sometimes difficult to differentiate between an axe and an adze, but the chief difference lies in the method of hafting. While the cutting edge of an adze is transverse (at right angles) to the axis of the haft, it is parallel in the case of an axe. One side (the outer side) is rounded off, while the inner edge is ground to give a bevel or a chisel-end to correct the cutting angle of the tool in relation to the position in which it is held by the haft or the hand.[35] No. 7 is a chipped and polished adze with its butt-end broken. The top is rounded and the bevel is made on the flat underside. The cutting edge is extremely sharp and polished. The sides are very much battered, probably due to some form of hafting like the club head type or perforated wood. No. 8 has a very sharp polished cutting edge, the underside is flat and the bevel is not so prominent as in the first.

10. Thin Flat Celt (Pl. XXI. 9-13)

Finally there is a group of very thin flake axes, with definite traces of use and polished cutting edges. Typologically this is the proto-type of the flat metal celts. The thick bodied and round celts, are ill-suited for cutting operations when compared to a thinner axe, with a reduced area of the cross-section which is functionally more efficient.[36] Evolution of the axe in Scandinavia, where it has been demonstrated very well, shows a progressive thinning from round to flat and then a thin body.

No. 9 is a fine thin flake axe with a tapering body and steep sides secured by removing small flakes all along the edge. The cutting edge is formed by the intersection of two flake surfaces. It is finely polished, probably due to use.

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[35] J. H. Cochlan, *Evolution of the Axe*, JRAI, LXXIII, p. 29.
[36] Cochlan, JRAI, LXIII, p. 36.

No. 10 is a thin chipped and polished axe with a convex cutting edge.

No. 11 is a chipped and polished axe head with a very thin and sharp cutting edge formed by the intersection of two flat surfaces. (The underside retains the prominent bulb of percussion.)

No. 12 and 13 are miniature axes, showing neat alternate step flaking all along the periphery. These have been included here on account of the flatness of the faces.

Methods of Hafting[37] (Pl. XXII)

An important problem in the study of the neolithic industry, is that of the methods of hafting. COGHLAN,[38] on an examination of a large number of axes from Britain, thinks that the form of the celts is largely conditioned by the mode of hafting favoured and the natural limitation of the material used. Some of the methods of hafting from other countries are described to elucidate what little indirect evidence we have from Bellary and elsewhere.

We have no direct evidence left about the methods of hafting the axes, etc., in vogue in India, except in the case of the belted hammer. But, up to now, in spite of the known extensive distribution of the neolithic axes in India, no perforated axe-heads have been found. So the axes were either held free hand or were hafted in perforated wood. The most interesting method of hafting comes from Banda District, U. P., where an axe has been found with a groove at the wide butt-end (No. 1, Pl. XXII).[39] This method of hafting called the "bent withy"[40] method, consists of a twig or a piece bent round the hammer and fixed in the groove (No. 2, Pl. XXII). Such a method used by the Koko Tai Yuri tribes of North Queensland, Australia, has been described by THOMPSON.[41] "A straight sapling is selected, the bark stripped off, and a strap of wood about three feet in length and two inches wide is cut from it. The strap of wood is pared down carefully and after a little warming up in the middle and smearing it with bees wax, is bent round the implement and both ends are tied at two or three places. This method survives even in America.[42] At Hosahalli in the Bellary district a grooved or belted hammer of the Australian type described above has been found.[43]

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[37] The illustrations of the methods of hafting are reproduced from the *Journal of the Royal Anthropological Institute*, Vol. LXXIII from COGHLAN's Paper on the *Evolution of the Axe*. Others are taken from FOOTE's *Indian Prehistoric and Proto-Historic Antiquities.—Notes on Ages and Distribution*, and DE MORGAN's *Prehistoire Orientale*, Tom. III. We are obliged to the authorities concerned.

[38] COGHLAN, JRAI, LXXIII, pp. 27-55.

[39] DE MORGAN, *Prehistoire Orientale*, Tom. III, p. 232.

[40] COGHLAN, Ibid.

[41] DONALD F. THOMPSON, *Notes on Some Bone and Stone Implements From North Queensland*, JRAI, LXVI (1936).

[42] *Memoirs of the Society of American Archæology*—Supplement to Vol. XII, No. 3, Part 2 (1947).

[43] Vide, the description and distribution of this type

None of the axes found in Bellary have any groove, but a few of them show marks of battering or indentation in the middle along the long axis of the tool. FOOTE[44] suggested what he called "spear-head" type of hafting. A hollow bamboo would be cut about three to three and a half inches above one of the joints and the butt-end was fitted into it and tied with a rope or some other binding medium. No. 3, Pl. XXII shows very clearly the position of the stone head resting on the joint septum as also the exact position of the lashing. This method is very well suited for picks and other digging and piercing tools, but not for axes used for cutting. Some of the picks from Bellary show evidence of a little pressure in the middle, which suggests a similar method of hafting, if they are not used in free hand like a cold chisel.

Another method of hafting is that of the antler socket from Lyngby.[45] A socket or a hole is bored into an antler and the butt-end is fixed into it. (No. 6, Pl. XXII). Very fine specimens of this type of hafting have been found in the Swiss neolithic lake dwellings (No. 9, Pl. XXII).[46]

Another method of hafting is the slot hafting method. The axe is inserted in a piece of perforated wood (Nos. 4 and 5, Pl. XXII). Many examples of this have been found in Western Europe. This has been found *in situ* at Aprachia by MALLOWAN. At Kish, a shell relief depicts a man carrying a wooden haft.[47]

Finally the bevelled adzes and the plano-convex shoe-last hoes are probably tied to a portion of the stem with a root or branch approximately at about 90°. In the shorter end the axe is fixed by means of rope (No. 7, Pl. XXII). If a cleft is made in the shorter end of the wood and the axe fixed into it, it will be a "knee shaft haft." Both the methods and especially the former, are very useful as plough-sharers.

Chisels

Sanganakallu has yielded a large number of chipped and polished chisels. FOOTE[48] classified chisels into six classes: those with (i) square bodies, (ii) with thick bodies, (iii) with a cross cut edge, (iv) with thick triangular body, (v) with broad ellipsoidal edge, and (vi) with sharp point. But he made no distinction between the pick and the chisel. The writer, however, has made a distinction, as

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[44] FOOTE, IPPA, p. 173.
[45] SHETLIG, FALK, and GORDON, *Scandinavian Archæology*, p. 14 (1937).
[46] DE MORGAN, *Prehistoire Orientale*, Tom. I, p. 293, Fig. 56-5.
[47] COGHLAN, JRAI, LXXII, p. 38.
[48] FOOTE, IPPA, p. 21.

both types of tools vary so much in their functions. The pick, used for digging and piercing operations has a pointed working end, and is generally chipped, while the chisel has a straight or convex working edge, used for cutting and splitting operations. Chisels are generally polished.

It is quite likely as suggested by BURKITT,[49] that the chisel form might have developed out of the narrow elongated celt. A number of such celts have been found, but it is dangerous to indulge in speculations.

The chisel No. 1 (Pl. XXIII) is an almost completely polished one with a sharp, broad and straight cutting edge. It has a pointed butt, which suggests that it might have been hafted into a piece of wood or bamboo. It has a thick flat oval section in the middle.

No. 4 is a broken, polished chisel, with a straight tapering working end. The sides are flattened.

No. 5 is a broken chisel with a working end, flat on one side and rounded on the other and is akin to a modern carpenter's chisel. The working edge is convex.

No. 6 is also a broken working end of a polished chisel.

No. 10 (Pl. XXIII) is a long chipped and polished chisel with a semi-rectangular cross section and a straight, broad cutting edge.

Picks

These are rough, irregular tools, made almost only by chipping, with narrow sharp working ends and blunt butt ends suitable for use with a wooden mallet. Probably in some cases these were used also as cold chisels. They might have been fitted into wood or bamboo (see spearhead type of hafting already described) as many of them are bruised in the middle along the long axis and some of them have their high surfaces ground due to pressure (polished surfaces shown in black). No. 8 has a waist in the middle which is very well suited for free hand use. The waist in this case is deliberately made by removing two flakes on either side.

No. 2 (Pl. XXIII) is a chipped and polished pick, with a thick blunt butt and a polished sharp ground working end, flat on one side and rounded on the other like an adze-end. The blunt butt bears traces of battering, showing that it might have been used as a cold chisel in free hand, and pressure applied on the top.

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[49] BURKITT, *Our Early Ancestors*, p. 106.

No. 7 has a very long sharp point secured by chipping all over with an almost rhomboidal section across the working end. The other end is pointed and parallel convergent flakes are taken to secure the pointed end which is probably fitted into wood.

No. 8 is a semi-cylindrical pick with a point at one end and a waist in the middle. At the point where the waist begins, some parts of the high surfaces of the pick are ground.

No. 9 has a pointed chisel end as its working end and has a segment-shaped body (straight on one side and convex on the other side—not the faces of the tool which are flat). In the middle the pick bears traces of battering.

No. 11 is the broken butt end of a pick showing traces of former use (polished surfaces shown black).

No. 12 is an unfinished pick.

Fabricator

The fabricator is a rough, irregular, cylindrical tool blunted at both the ends. It is almost a "stone finger" and can be used for a variety of purposes. The ends are bruised showing that they are used as a punch. It is very well suited for a flaking tool in the course of the manufacture of axes, etc. The size varies from two and a half to five inches.

No. 13 is a cylindrical fabricator chipped all over and both the ends are bruised. Nos. 14, 15 and 17 are similar specimens. Nos. 14a and 14c are the bruised ends of the fabricator. No. 16 is a small fabricator and the ends are slightly tapering and not flattened.

MISCELLANEOUS TOOLS

Pounder

A large number of pounders or hammer stones, have been found in the Bellary District, including about eleven found in the excavation. They are large, flat, thick discoids. The sides were generally battered showing that the flat faces were held in the hand and pressure applied through the sides. Some of them are oblong, but generally they are round. KNOWLES[50] found out in the course of his experiments on stone flaking, that "a symmetrical, pointed, and slightly flattened oval pebble" was good for striking flakes from the core.

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[50] SIR FRANCIS H. KNOWLES, *The Manufacture of a Flint Arrowhead by Quartzite Hammerstone*, (1944), p. 6.

Grooved or Belted Hammerstone (Pl. XXIII. 20-25.)

At Hosahalli in the Kudlighi taluk was found by FOOTE, a hammerstone with a groove for hafting purposes. "It is a broad, round-faced hammer of granite. The round face is much broader than the butt-end and there is a very distinct constriction round the middle of the hammer."[51] The method of hafting such a tool was noticed by EVANS[52] in Australia and THOMPSON in North Queensland.[53] In the Fayum Desert, also, grooved hammerstones have been found.[54]

This type seems to have a very wide distribution in India. A highly polished belted hammer of grey gabbro was found at Rupavati in Kathiawar by FOOTE.[55] RIVETT CARNAC[56] described one from Alwara (two miles north of Jumna), its length was 3.5 inches, breadth 2.1 inches and thickness 1.8 inches. Similar specimens have been found at Tikari, in the Harimpur District by CUNNINGHAM, by SETON KARR in the Banda District and five hammer-stones of quartzite and schistose diorite from Assam.

A slight variant of this form was found in the United Provinces and Central Provinces. They have deep indentations instead of a groove.

Slick Stone or Polishing Stone (Pl. XXIII. 18)

This plano-convex thick oval stone may be called a slick-stone or a rubber or polisher. The rounded top of the stone is held in the hand and the flat under-surface is rubbed against the object to make it smooth. No. 2 is chipped all over and the bottom or the working side is highly polished due to rubbing on a flat surface. This is found in the excavation. A good specimen of this type was found by FOOTE in the Shevroy hills.

Sling Stones (Pl. XXIII. 19)

A number of perfectly spherical stones without any battering have been found, whose function it is very difficult to judge. They might be sling stones. The size varies from 1.25 to 2.5 inches and they are made of granite or gneiss. No. 19 was found in the excavation.

Discs (Pl. XXIII. 26)

A large number of these interesting flat discs of stone have been found all over the District. The material used is generally coarse-

[51] FOOTE, IPPA, p. 86.
[52] EVANS, *Stone Implements, Weapons and Ornaments of Great Britain*, p. 168.
[53] THOMPSON, op. cit., JRAI, LXVI, (1936).
[54] G. CATON THOMPSON and E. W. GARDINER, *The Desert Fayum*, Text, p. 40, Plate XXIX 79.
[55] FOOTE, IPPA, p. 141.
[56] COGGIN J. BROWN, JRASB (1883), pp. 221-230.

grained chrome mica gneiss. This beautiful patchy white stone disc must have some significance, which is beyond our comprehension. They are generally flat and bear no traces of being used as querns. No. 26 is a disc of chrome mica gneiss, slightly ovoid with a length of five inches along the long axis. In the excavation, a broken half of an elliptical plano-convex disc of granite was found in the tenth layer.

Perforated Mace Heads or Ring Stones

One complete and one broken ring stone or perforated hammer were found by FAWCET[57] at Kupgal and one by BOYS[58] on the "North Hill" of Bellary. The latter is made of diorite and is highly polished and elliptical in shape (No. 176 of the "Catalogue of Prehistoric Antiquities in the Madras Museum," 1901). FOOTE[59] found one specimen at Kanchikeri. This has a very wide distribution in India.

Microlithic Industry of Phase II

Microlithic industry of Phase II seems to be indeed a part of the general neolithic culture of the region. It includes as seen above primarily long and short parallel-sided blades, lunates, and fluted cores. Both stratigraphically and typologically it is different from the microlithic industry of Phase I. The industry does not seem to be related to Kurnool Series IV of BURKITT and CAMMIADE,[60] which from the variety and types of tools seems to be true mesolithic. The Bellary industry seems to have a very wide distribution in South India. For example, as already noticed, FOOTE found microliths in association with axes at Patpadu (Kurnool District). At Maski from the large number of published and illustrated microliths found with the axe heads, it seems the parallel-sided short blades survived into the polished axe phase.[61]

A very interesting confirmation of the character of the microlithic industry comes from the north-eastern corner of the District where in a small area of about thirty square miles along the bank of the river Tungabhadra, a rich microlithic industry characterized by the presence of the short blade fluted cores (suggesting the predominance of the short blade), has been noticed on the surface, from the following sites: Nagaldinne, Gurjala, Rayachoti, Peta and Mit-

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[57] FAWCET, AQR, New Series III (1892), p. 142.
[58] FOOTE, IPPA, p. 81-82.
[59] IPPA, CR. p. 100.
[60] BURKITT and CAMMIADE, *Fresh Light on the Stone Age Cultures of the South Eastern India Antiquity*, Vol. IV, 1931.
[61] *Annual Report of the Archæological Survey of H. E. H. the Nizam's Dominion*, 1936-37.

tesompuram. Even at Sanganakallu a number of fluted cores have been found as already stated. (Pls. XXIV and XXV.)

They provide evidence about the technique of making short blades. Following the classification of H. H. KIDDERS and BARNES[92] the cores are classified into those with (1) pointed (or sharply rounded cortex), (2) flat base and (3) a chisel end. Many of the cores show facetted platforms. This indicates that the core is prepared in advance by facetting or removing small flakes for the punch (with which the blades are taken out) to rest firmly at the time of striking. Generally, this technique seems to be uniform in all mesolithic and neolithic industries as noticed by BARNES in areas as widely separated as England, Scotland, India and Australia.

Cores With Pointed Bases (Pl. XXIV and XXV)

Sanganakallu has yielded two cores with pointed bases. But Nagaldinne specimens show the predominance of cores with sharply rounded cortex. The people used the small water-worn pebbles of quartz, so abundant in the shingle beds of the river Tungabhadra. No. 1 (Pl. XXV) from Sanganakallu is made of green jasper, has a well facetted platform, and flakes are removed all round the body of the core. No. 3 also from Sanganakallu is of chert with the flakes removed only on one side, leaving a large portion of the cortex on the other face. Curiously there is a large plunging flake on that side of the platform, which probably made it difficult for the punch to rest. Nos. 1 to 6 and 8 (Pl. XXIV) are all fluted cores of quartz with the rounded pebble end, providing a sharply rounded cortex. All their platforms are flat and plain but they do not show good evidence of facetting (quartz is a bad material for flaking).

Cores With a Flat Base

Generally the flat-based cores show evidence of the previous preparation of the platform. No. 2 from Sanganakallu is a fluted core of chalcedony and its platform is facetted. No. 9 from Nagaldinne is made of quartz and only three flakes are taken out of it. No. 11 from Mittesompuram, No. 12 from Gurjala and No. 15 from Rayachoti are flat-based, fluted cores with facetted platforms.

Cores With Chisel Ends

These fluted cores with sharp chisel ends[93] formed by the intersection of two negative flake scars of "plunged flakes" at the bottom of the core might have been used. No. 6 from Sanganakallu shows a fine chisel-ended core of chert with a notch or a waist on the plat-

[92] ALFRED S. BARNES, *The Technique of Blade Production in Mesolithic and Neolithic Times*, PPS XIII, No. 6, p. 105.
[93] A. J. H. GOODWIN, *Method in Pre-history*, p. 72.

form side formed by removing deep flakes from the same platform. The platform is facetted. No. 4 also from Sanganakallu has a plain platform but a wider chisel end. No. 23 from Rayachoti is also a chisel-ended core with a facetted platform.

CLASSIFICATION OF SHORT-BLADE CORES FROM THE BELLARY DISTRICT

L = Length in millimetres.
B = Breadth in millimetres.
T = Distance from the flaking surface to the back.

No.	Place	Type	L	B	T	Remarks
1.	Sanganakallu	Pointed base	38	17	16	Facetted platform
2.	Sanganakallu	Flat base	19	17	5	"
3.	"	Pointed base	33	24	14	"
4.	"	Chisel end	26	16	8	Plain platform
6.	"	"	27	12	10	Facetted platform and a waist or a socket for hafting
1.	Nagaldinne	Pointed pebble cortex	36	24	14	Plain platform
2.	"	"	25	25	17	"
3.	"	"	32	25	19	"
4.	"	"	27	25	9	"
5.	"	"	24	23	17	"
6.	"	"	24	25	14	"
8.	"	"	26	22	9	"
9.	"	Flat base	25	19	12	"
11.	Mittesompuram	"	48	21	15	Facetted platform
12.	Gurjala	"	38	24	24	"
13.	Rayachoti	Chisel end	36	24	12	"
14.	Mittesompuram		19	12	—	"
15.	Rayachoti	Flat base	28	24	14	"

INDEX TO PLATES

			Page
Plate	A.	1. A general view of Sannarasama hill (Sangana-kallu.) 2. Area on the top of the hill. 3. Polishing grooves at Sanganakallu. 4. Disc beads found in the excavation. 5. Megalithic pottery of Phase III.	Facing 2
Plate	I.	Map showing the places mentioned in the report.	viii
Plate	II.	Pre-historic settlements of Sanganakallu and Kupgal.	4
Plate	III.	Section of Trench II facing south-west.	6
Plate	IV.	Section of Trench I facing north-east.	8
Plate	V.	Megalithic pottery: Types I to V.	12
Plate	VI.	Pre-megalithic pottery: Type VII.	14
Plate	VII.	Pre-megalithic pottery: decorated types and Type XVI.	16
Plate	VIII.	Megalithic pottery: Type VI. Pre-megalithic pottery: Types XII, XIII, XV and XVII.	17
Plate	IX.	Pre-megalithic pottery: Types XVIII and XIX.	19
Plate	X.	Geological map of the Bellary District showing the relation of pre-historic sites to trap dykes.	30
Plate	XI.	Axes from the excavation: 1. Re-chipped axe with a polished cutting edge. 2. An unfinished axe in the second stage of manufacture. 3. An unfinished axe in the first stage of manufacture. 4. A broken axe of Type 2 with a fine polish. 5. A broken, chipped and polished axe. 6. A chipped and ground axe of Type 4. 7. A broken butt end of an axe of Type 4. 8. A polished flake axe.	48
Plate	XII.	Miscellaneous finds from the excavation: 1. A broken plano-convex ellipsoid palette (?) 2. A broken butt end of a chisel. 3. A broken butt end of a chisel. 4. The working end of a finely polished chisel. 5. A bone awl (?) 6. A worked bone (?) 7-8. Spindle-whorls (?)	49
Plate	XIII.	Heavily patinated flakes from the excavation: 1-14. Longitudinal flakes. 15. A thick discoid flake showing a technique resembling "Levallois." 16. A thick discoid bi-faced flake retaining the large primary flake surface on the underside.	50 51
Plate	XIV.	The microliths of Phase I.	
Plate	XV.	The microliths of Phase II. 1 and 2. Lunates blunted along the arc. 3-17 and 28. Parallel-sided blades blunted on one side by retouch. 18-27 and 29-39. Simple blade flakes without retouch.	52
Plate	XVI.	Lightly patinated flakes from the surface. 1-5 from Rayadrug and the rest from Sangana-kallu and Kupgal. 1-3 and 7-11. Longitudinal flakes. 12. A retouched flake. 13. A concavo-convex flake. 14. A retouched flake end-scraper (?) 4. Thick discoid flake worked on one side. 5. A discoid flake worked on both sides.	53

Plate XVII. The lightly patinated flakes and axes from the surface.

1. A thick discoid flake showing the technique resembling "Levallois" with the large primary flake surface left intact.

2, 3. Discoid bi-faced flakes.

4, 5. Thick oval bi-faced flakes (Note the portion of the primary flake surface on the underside).

6. A pointed, oval, irregular axe (?).

7. A chipped axe in the first stage of manufacture, showing bold alternate peripheral step flaking leaving the portions of the primary surface on both sides.

8, 9. Chipped and ground axes. 54

Plate XVIII. Axes in all stages of manufacture.

1. A large axe in the first stage of manufacture showing signs of bold primary step flaking leaving high prominent ridges.

2. An axe in the second stage with the high ridges removed, making the tool ready for grinding.

3. An axe after the second stage, with a ground or polished cutting edge. (shown by straight shading)

4. An axe after the third stage showing preliminary grinding which gives a rounded appearance to the tool.

5, 6. Highly polished axes after the final stage. 55

Plate XIX. Axes in the first two stages of manufacture showing more details.

1. Axe in the second stage.

1a. The face of the axe showing flaking on the sides.

1b. The side of the same axe showing the bold alternate step flaking.

1c. The underside of the axe showing the large primary flake surface (portion left unshaded).

1d. The cutting edge of the axe showing neat, tiny step flaking.

2. Axe after the first stage with prominent ridges. 56

Plate XX. The forms of Bellary neolithic axes.

1. An axe of Type 1 with an ellipsoidal or oval section.

2, 3, 4 and 5. Axes of Type 3 with circular sections.

6-8. Axes with semi-rectangular cross sections—Type 4.

9, 14. Blunt-butted axes, Type 5.

10-13. Plano-convex "Shoe-last" type—Type 6. ... 57

Plate XXI. The forms of Bellary axes.

1-5. Axes with semi-rectangular bodies and straight cutting edges—Type 7.

6. An axe hammer—Type 8.

7, 8. Adzes—Type 9.

9-12. Thin flat celts—Type 10. 58

Plate XXII. Methods of hafting.

1. Grooved or belted axe from Banda.

2. "Bent-withy" method of hafting grooved axes and pounders.

3. "Spear-head" type of hafting.

4, 5. "Club head" type of hafting.

6, 9. Antler hafts.

7. Adze hafting with the cutting edge transverse to the axis of the haft.

8. Axe tied to the haft. 59

Plate XXIII. Other neolithic tools.

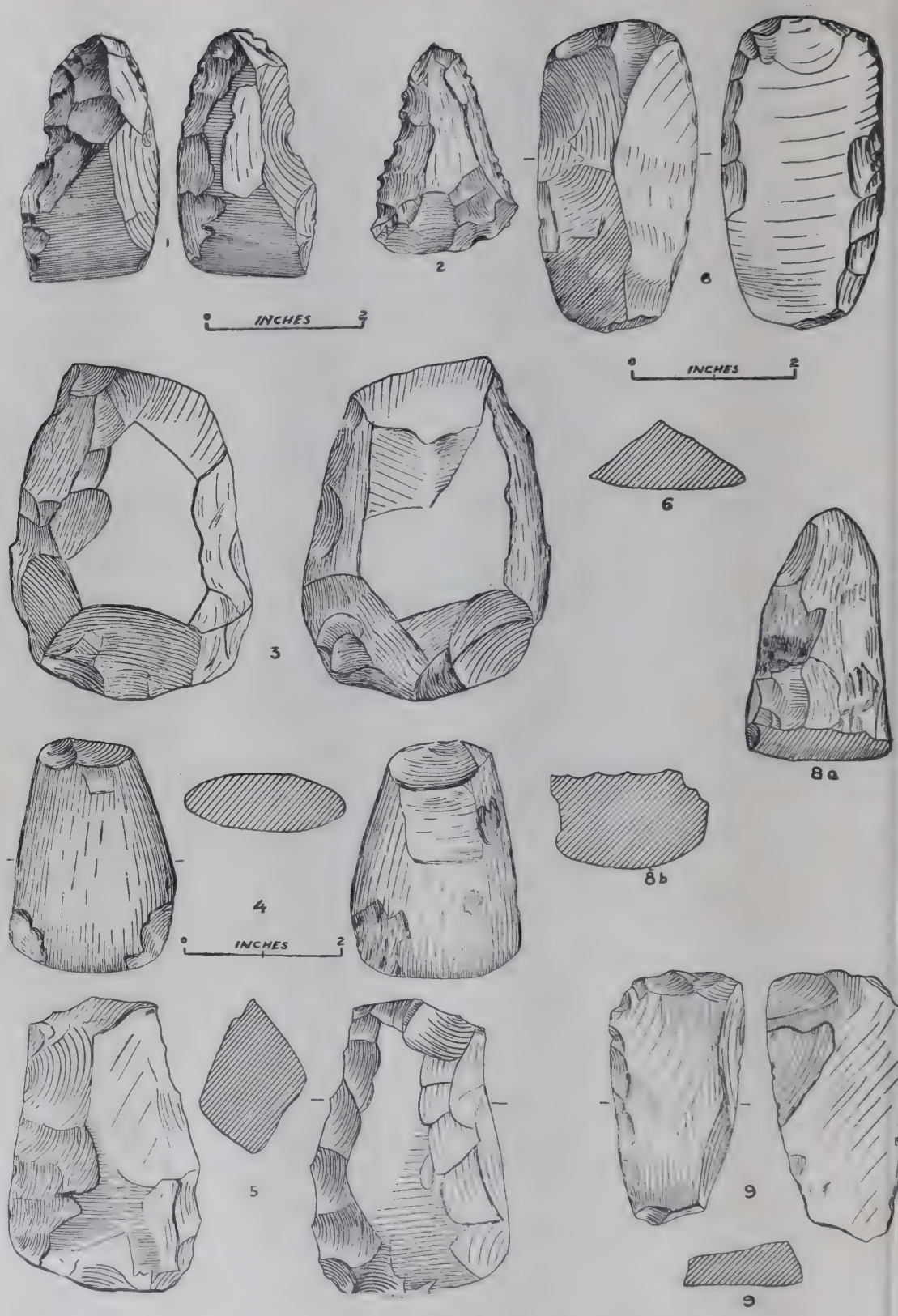
1. Polished chisel with a wide cutting edge and a pointed butt.
2. Pick with a ground working end and a battered butt.
3. Broken working end of a pick.
4-6. Broken working ends of finely polished chisels.
7. Chipped pick with a long pointed working end.
8. Pick with a waist in the middle. The surface near the waist is ground due to use (polished surface shown black).
9. Pick with a ground working end.
10. Long chisel with a broad straight cutting edge.
11, 12. Broken picks.
13-17. Fabricators.
18. Slick-stone (polished working side left unshaded).
19. Sling-stone (?).
20-24. Grooved hammer stones from Assam.
25. The method of hafting such a pounder as practised in North Queensland.
26. Disc or palette (?). 60

Plate XXIV. Fluted short-blade cores from the surface.

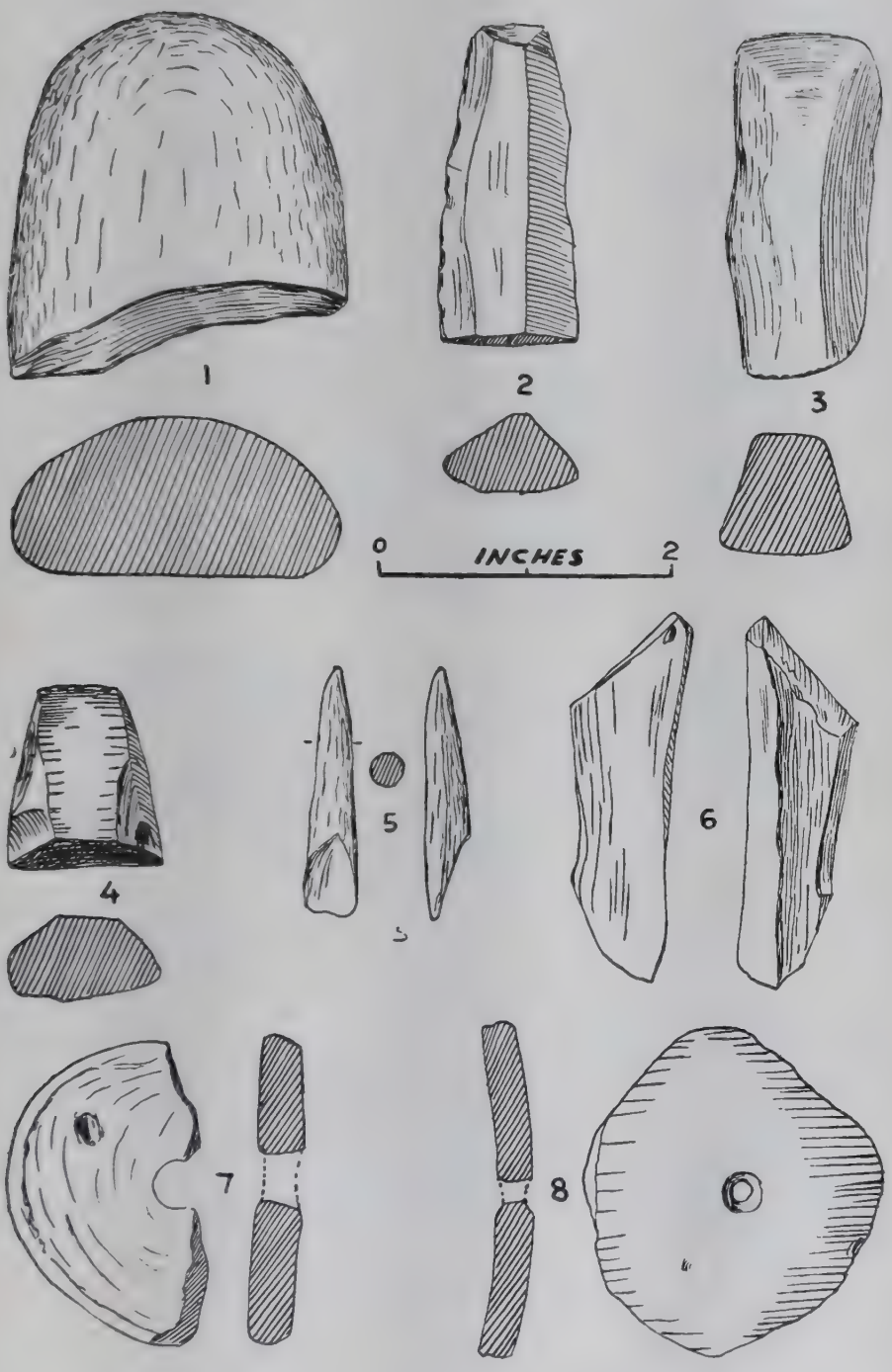
1-10. Cores with a rounded cortex base from Nagaldinne.
11-14. Flat-based cores with facetted platforms from Mittesompuram.
12. Flat-based core from Gurjala.
13. Chisel end core from Rayachoti.
15. Flat-based core from Rayachoti.
16-21. Flakes from Nagaldinne. 61

Plate XXV. Short-blade cores from Sanganakallu (Surface).

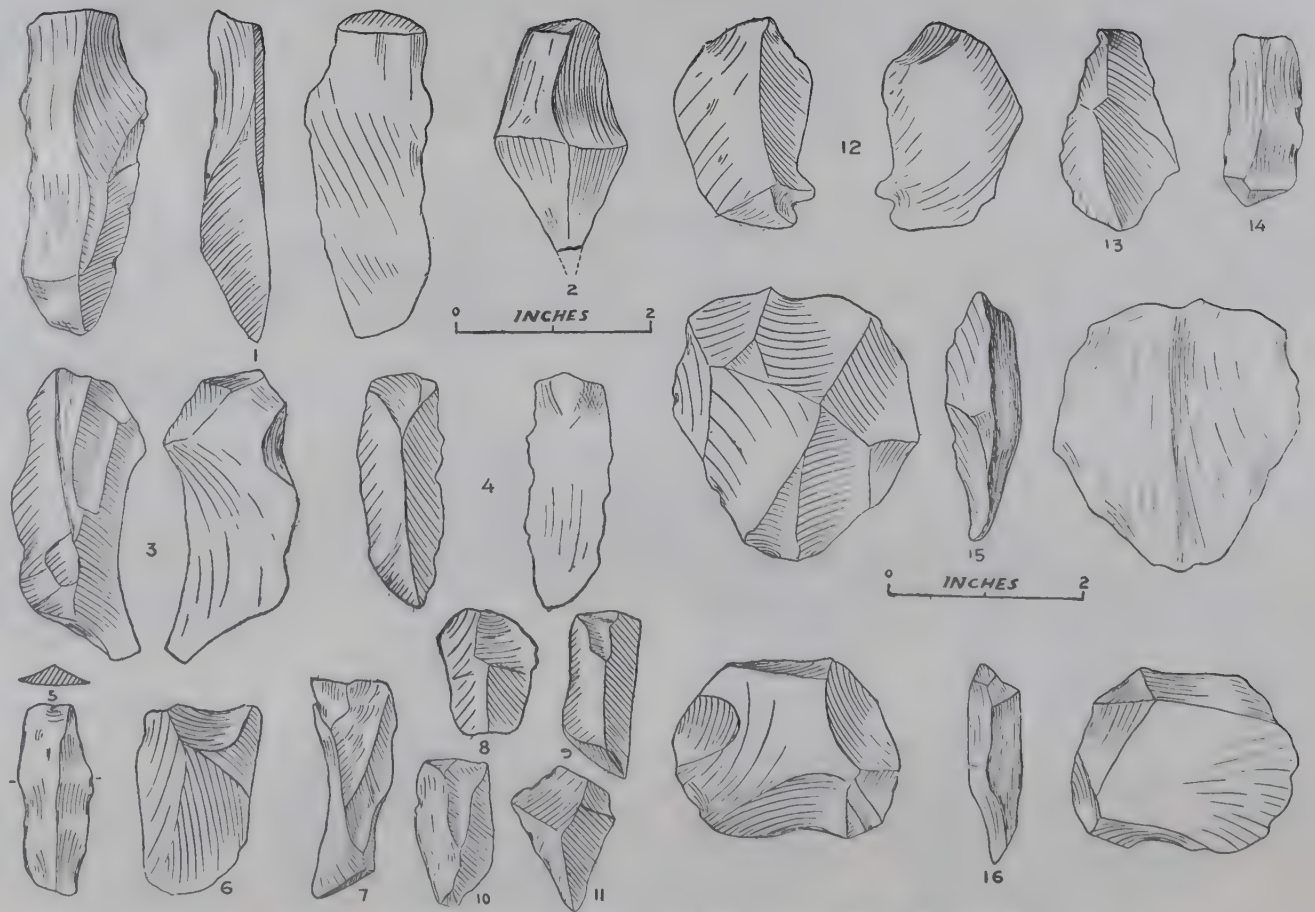
1, 3. Cores with pointed butts and facetted platforms.
2. Flat-based core.
4. Chisel-end core.
5. Core scraper.
6. Chisel-end core with a notch. 62



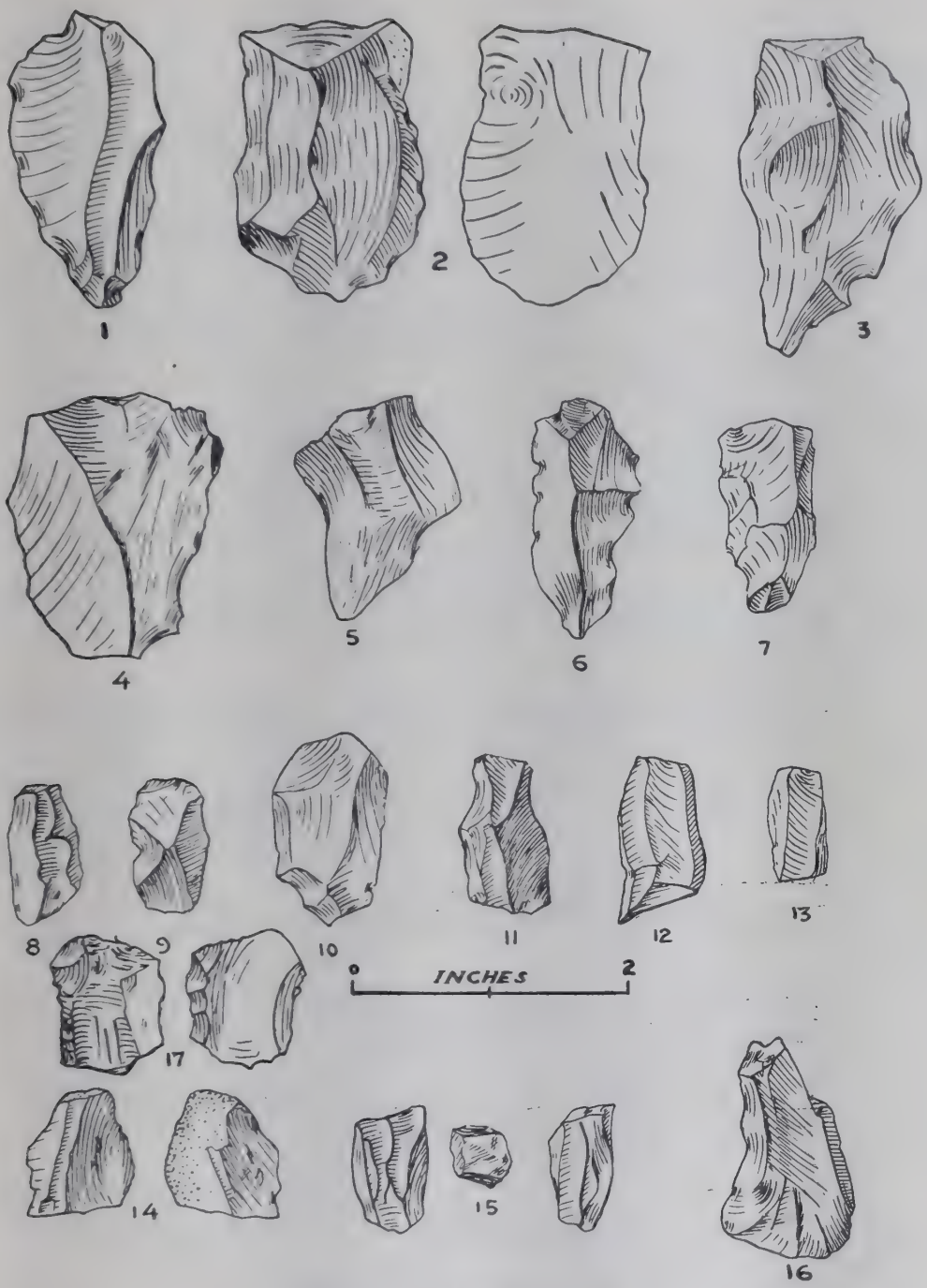
PL XI AXES FROM THE EXCAVATION



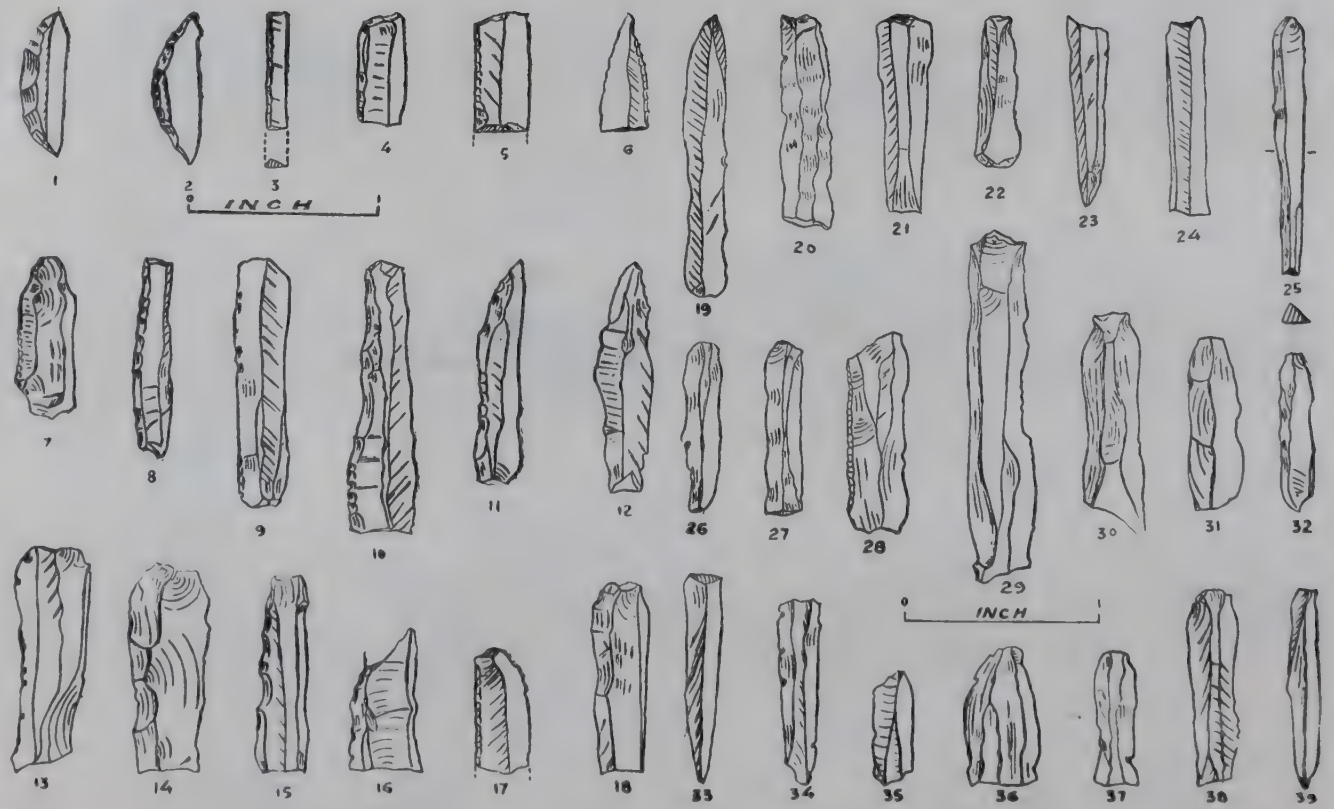
Pl. XII. PALETTE (1), CHISELS (2-4), WORKED BONE (5-6), SPINDLE-WHORLS (7-8) FROM THE EXCAVATION.



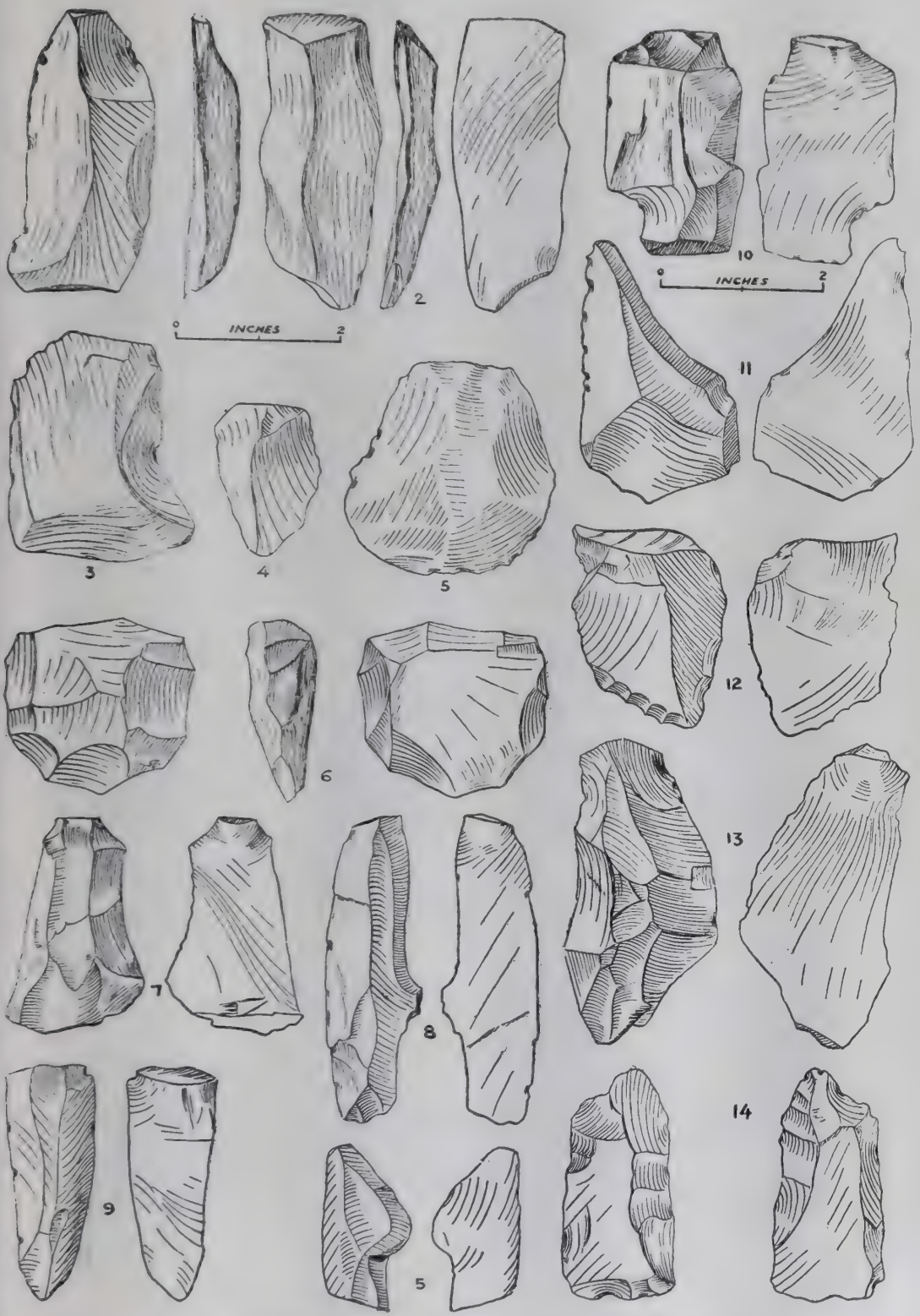
PI. XIII. HEAVILY PATINATED FLAKES FROM THE EXCAVATION



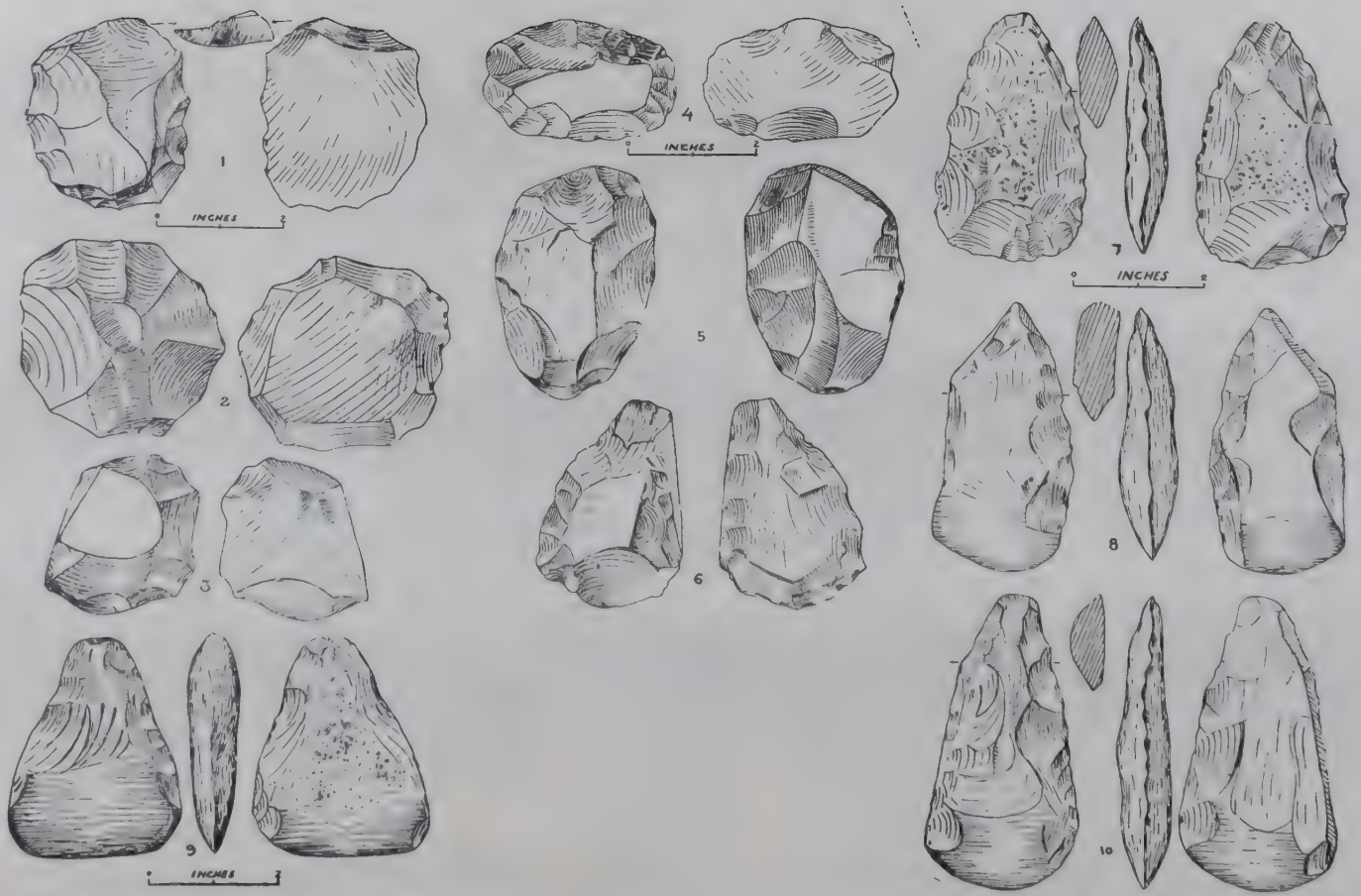
Pl. XIV. MICROLITHS OF PHASE I



PL. XV. MICROLITHS OF PHASE II

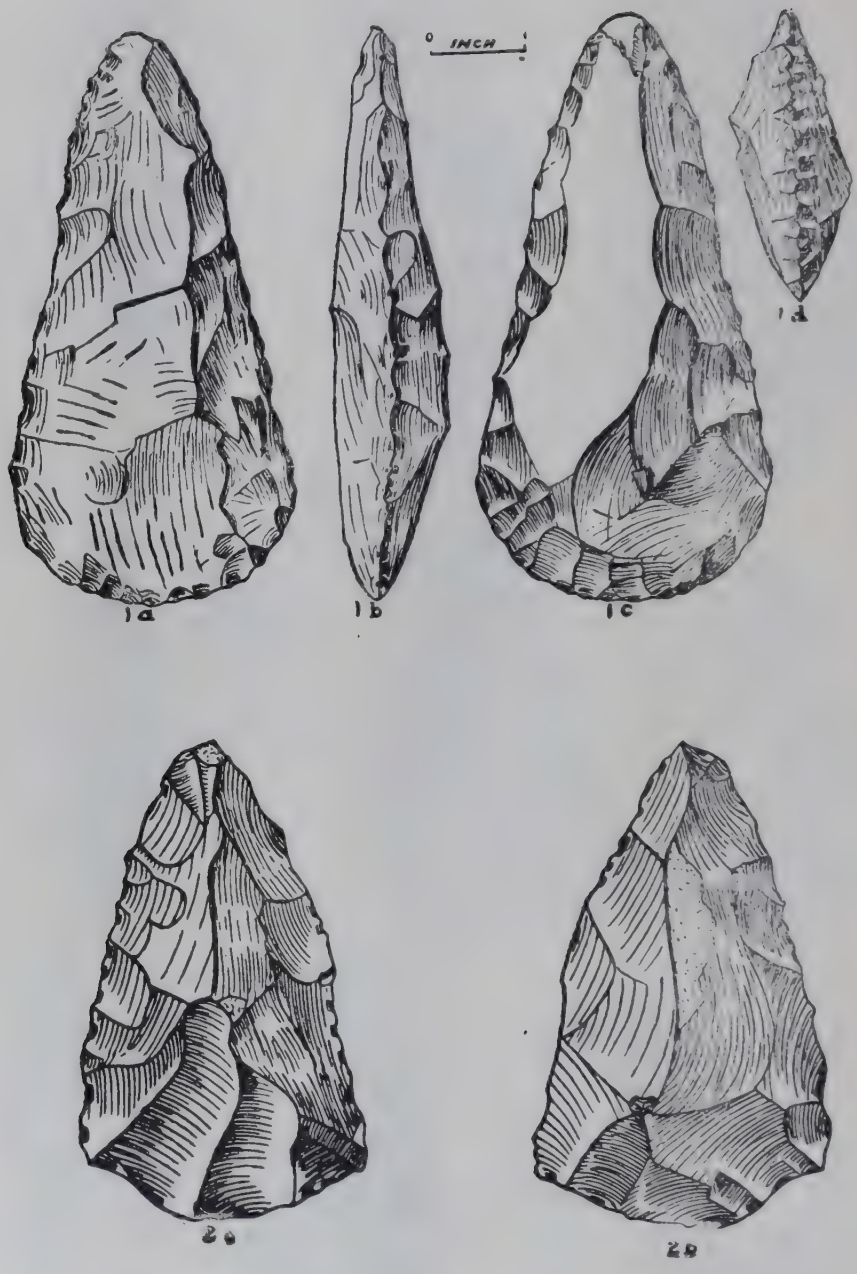


PL XVI. LIGHTLY PATINATED FLAKES FROM THE SURFACE

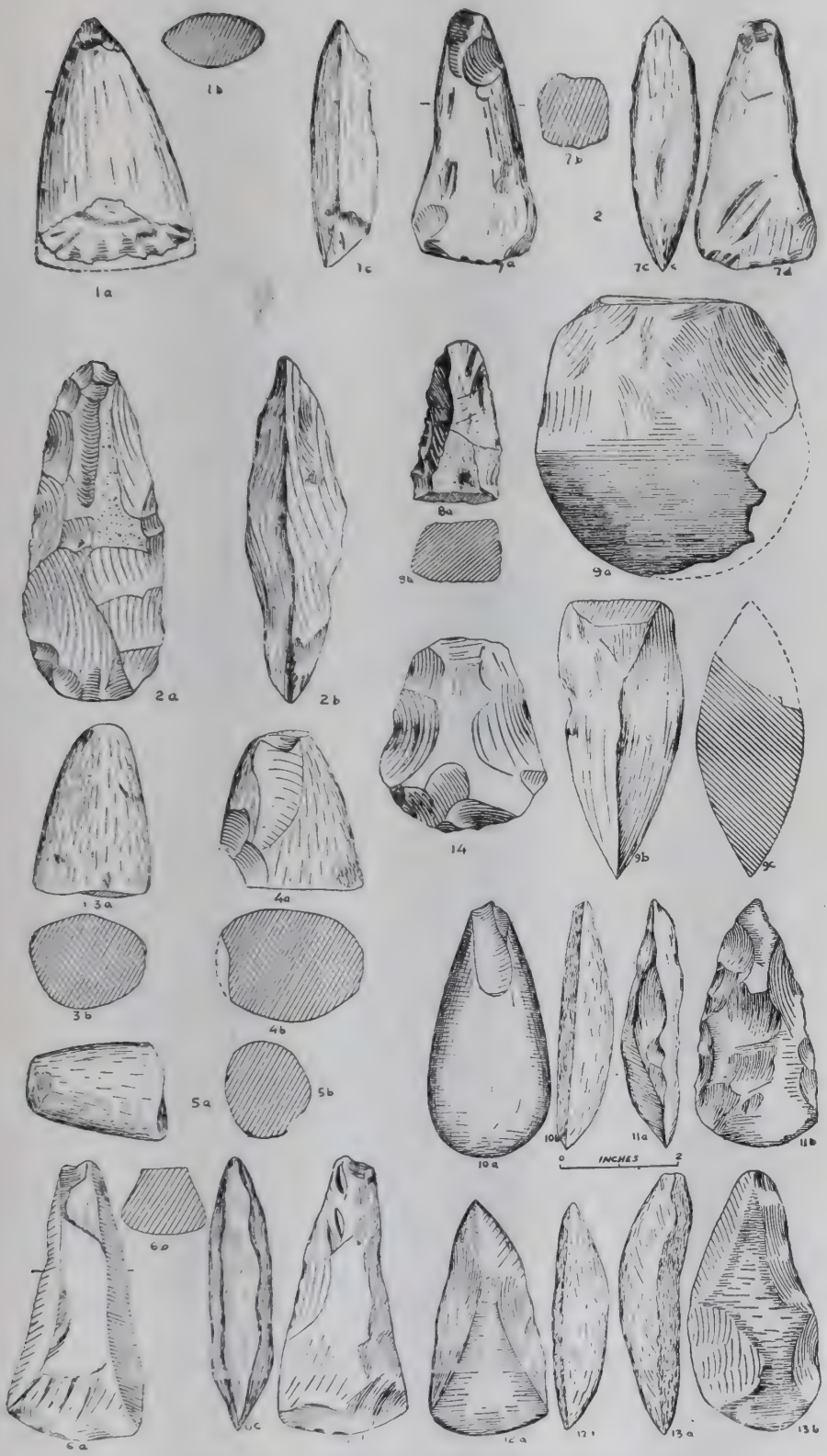


PI. XVII. LIGHTLY PATINATED FLAKES AND AXES FROM THE SURFACE

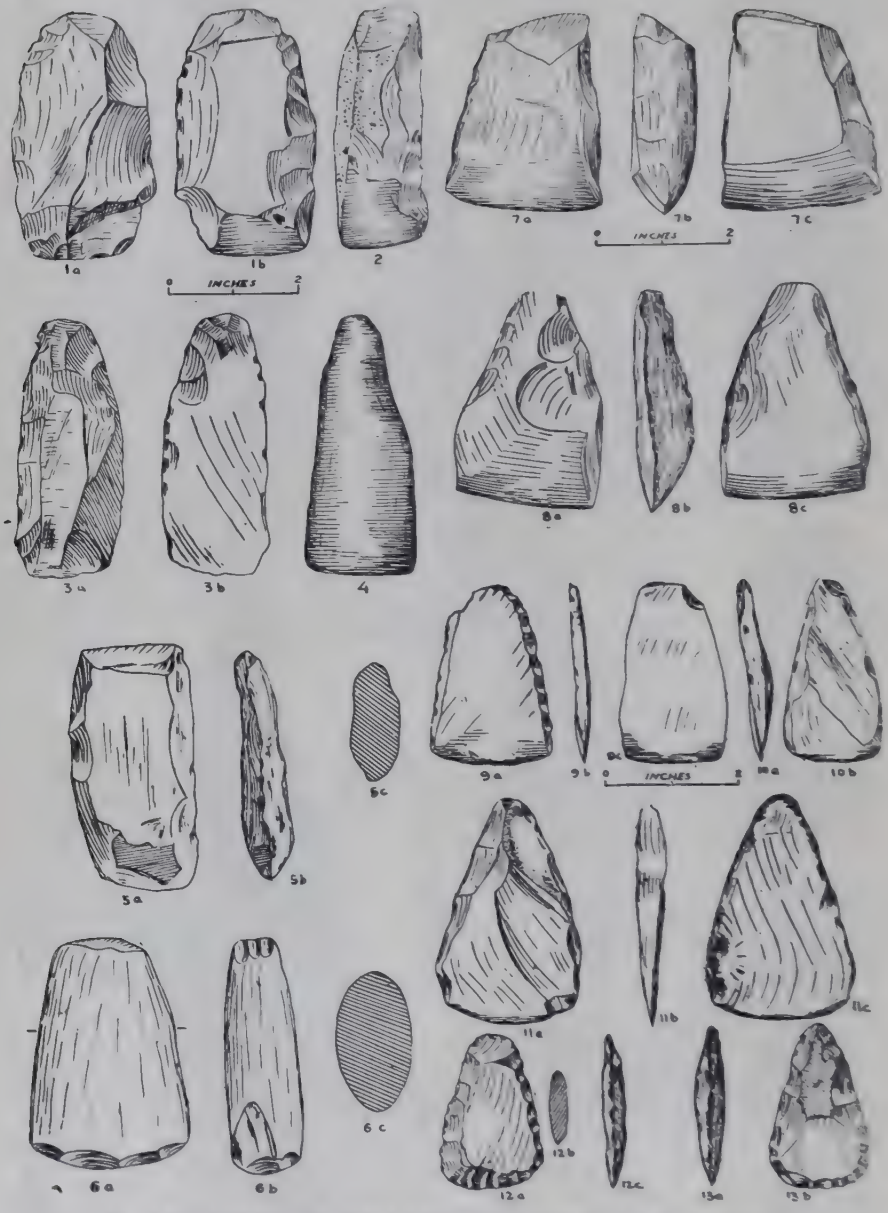
PI. XVIII. AXES IN ALL THE STAGES OF MANUFACTURE.



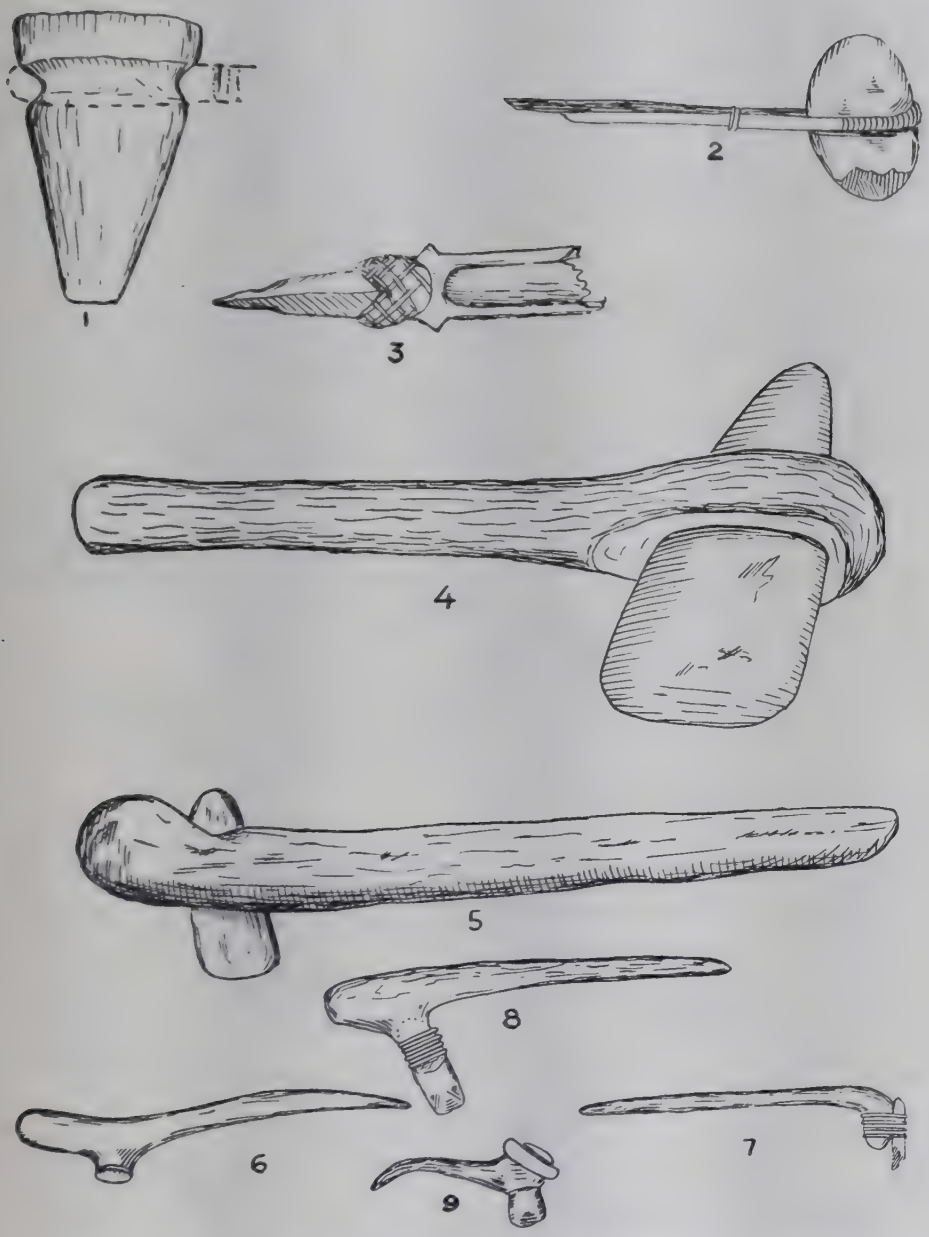
PI. XIX. AXES IN THE FIRST TWO STAGES, SHOWING MORE DETAILS



PL XX. FORMS OF BELLARY NEOLITHIC AXES, TYPES 1-6.

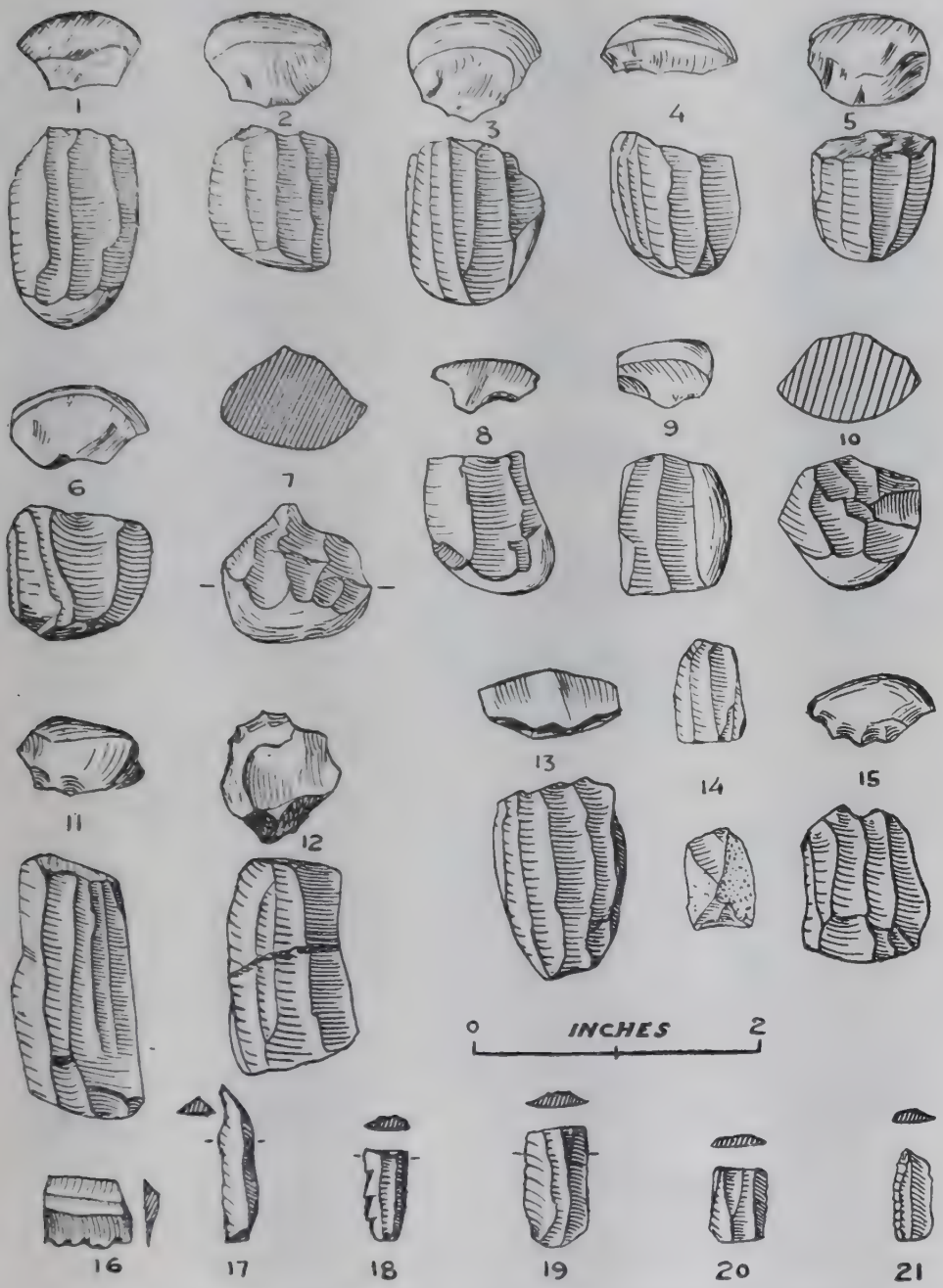


PI. XXI. FORMS OF BELLARY NEOLITHIC AXES. TYPES 7-10.

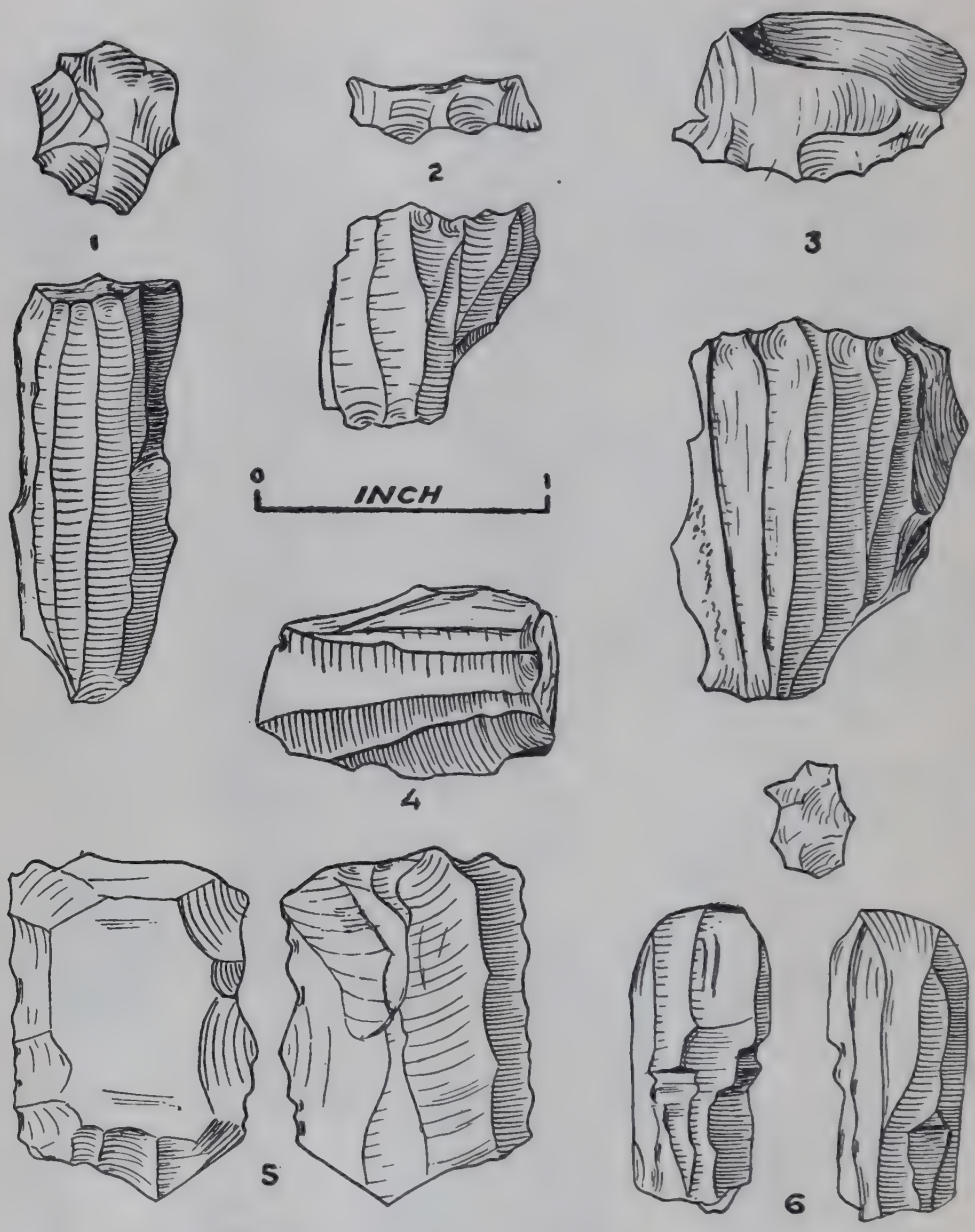


Pl. XXII. METHODS OF HAFTING (After Foote, Coghlan and Morgan.)

Pl. XXIII. CHISELS (1, 4, 6, 10), PICKS (2, 7-9, 11-12), FABRICATORS (13-17). HAMMER STONES (20-25). DISC (26), after THOMPSON and BROWN.



Pl. XXIV. FLUTED SHORTBLADE CORES FROM THE NAGALDINNE AREA.
(Surface)



Pl. XXV. SHORT-BLADE CORES FROM SANGANAKALLU (Surface)

Printed by L. C. Shepard at the Oriental Watchman Publishing House, and published by Dr. S. M. Katre for the Deccan College Postgraduate and Research Institute, 10 Connaught Road, Poona 1. 750—3767-48.

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